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ARITHMETICAL EXAMPLES

FOR THE USE OF

MARLBOROUGH COLLEGE

PART I.

ARITHMETICAL EXAMPLES

FOR

THE USE OF

MARLBOROUGH COLLEGE.

PART I.

LONDON:
DAVID NUTT, & Co., 270, STRAND.

1866.

181. g. 227.

BIBLIOTHECA · BODLEIANA
DOMINUS ILLUMINATIO MEA

I.

MISCELLANEOUS EXAMPLES

IN THE FIRST FOUR RULES.

1. Reduce 333333 square yards to acres.

2. If a sovereign weighs 5 dwt. 8 gr., what is the value of 106 lbs. 9 oz. 16 dwt. of the same metal?

3. How many pounds, shillings, pence and farthings in 19 guineas, 13 crowns, 21 florins, 16 shillings and 11 farthings?

4. A merchant bought 7 chests of tea, containing respectively 25 cwt. 1 qr. 17 lbs.; 152 lbs. 13 oz.; 24 cwt. 2 qr. 19 lbs.; 29 cwt. 27 lbs.; 37 cwt. 1 qr. 1 lb. 10 oz.; 2 tons 13 cwt. 88 lbs. and 1625 lbs. 7 oz. Find the whole weight of tea bought.

5. From June 18. 1815 to Dec. 25. 1864, how many days?

6. Divide 3964 tons 17 cwt. 1 qr. 11 lbs. by 19 and by $27\frac{1}{2}$.

7. The earth describes every year an orbit 597,600,000 miles long; what is its average rate of motion per hour?

8. If 196 cwt. of sugar cost £ 735, what will one cwt. cost?

9. The Austrian National Debt amounts to 2,306,236,856 florins. Express its amount in words, reduce its value to English Money (an Austrian florin = 1/8) and find how long it would take to count at the rate of 96 florins a minute, working 10 hours a day.

10. The remainder of a division is 37, the quotient 326, the divisor $2\frac{1}{3}$ times the sum of both. Find the dividend.

11. Multiply 379,864 by 17,346⅔.

12. Find the cost of 49,000 cubic feet of gas at 4/7 per 1000.

13. Find the value of 11 chests of tea, each containing 39 lbs., at 5/7¼ a lb.

14. The fares of 15 persons travelling the same distance amounted to £8. 8. 9; what was each person's share, if five of them travelled half-price?

15. The distance of Herschel from the Sun is one thousand, eight hundred and ten millions of miles. Find how long it will take a ray of light to reach the planet, at the rate of 192,268 miles per second?

16. An old miser left his daughter a writing-table, in which there were found 13 drawers, in each drawer 7 divisions and in each division 3 purses each containing 70 pounds in gold, 14 crowns, 3 half-crowns and 217 pennies. Find the value of the legacy.

17. Arrange the figures 194,678 in the six different ways in which 194 are the first three figures in order, and in the six different ways in which 678 are the last three figures in order; and add the twelve arrangements together.

18. How many herrings can be bought for 2/6 at 2 for three half-pence — and what would be the value of 10,000 at the same rate?

19. The total value of coal raised annually amounts to £ 20,908,803. 10. and the weight of it to 83,635,214 tons. Find the average value per ton, and the total increase in value represented by a rise of 6d. per ton.

20. There are 250,000 persons employed in coal mining; find their average receipts per annum.

21. A man bought 1000 yards muslin at 3/7¼, and sold it at a profit of 2¼d. a yard. Find the whole amount received and total gain.

22. Divide 57,163,094,567,108 by 347,180.

23. Multiply 97 Miles, 4 furlongs, 12 poles by 17¾.

24. In £2137. 15. 4¾ how many half-crowns, florins, shillings, fourpenny-pieces and farthings?

25. Find the value of 297 chests of tea at £19. 7. 3 a chest.

26. The aggregate value of our exports from the twelve chief ports is £106,962,555; of this London exports £31,523,812 and Liverpool £50,297,135; what is the average value of the export trade of the others?

27. Multiply 98,756 by 60,324, and find what number added to the result will make it divisible by 90,000 without remainder.

28. If prize money to the amount of £1785 be divided equally among 126 seamen, how much will each receive?

29. Find the cost of 37 cows at £23. 5. 7¼ each.

30. A gentleman whose average expenditure is £3. 4. 9¼ per week saves every month £15. 7; find his annual income.

31. Divide 376 acres 2 roods 28 poles by 19.

32. The earth is distant 95 millions of miles from the sun; how long would it take an express train to reache the sun, travelling at the rate of 57 miles an hour?

33. What is the value of 25 gross of note books at 13/6 a dozen.

34. Sound travels at the rate of 1130 feet per second; if I see a flash of lightning 5½ seconds before I hear the thunder, how far off is the storm?

35. The whole number of cotton factories in 1860 was 2862, of operatives at work in them 451,569 and the amount of cotton imported 1,390,938,752 lbs. Find the average number of operatives in each factory and the amount of cotton consumed by it.

36. Write down in words the following quantity as

expressed in figures, 9,003,008,005; and write in figures six hundred and three millions twenty thousands three hundred and three.

37. Divide 56,438,971 by 4064, and prove the resul, to be correct.

38. A manufacturer has 360 hanks of yarn made into a warp containing 2520 threads; what is the length of the warp, supposing 840 yards to make one hank?

39. Reduce 49 acres 28 poles 10 yards 8 feet 112 inches to inches; and prove your result.

40. A tradesman borrowed £2000., without interest, and paid in the following manner: at Christmas, £256. 10s. 6d.; at Lady-day, £402. 10s. 9¼d.; and at Midsummer, £687. 10s. 11½d.; how much is still owing?

41. In the year 1821, there were coined in the British Mint 90 tons 19 cwt. 1 qr. 5 lbs. of gold, and its value was £9,520,732. 14s. 6d.; required the value of each ounce of gold.

42. A spinning mule of 528 spindles makes 7 stretches of 54 inches each in 3 minutes; what quantity of yarn is spun in 12 hours, if 840 yards make one hank?

43. "The silver of them that were numbered was an hundred talents and a thousand seven hundred and threescore and fifteen shekels; a bekah, that is, half a shekel, for every one that went to be numbered, for six hundred thousand and three thousand and five hundred and fifty men." — Ex. xxxviii. 25, 26.

How many shekels were there in a talent?

44. Add together £15 10s. 3¼d., £5 7s. 8½d., and 2s. 0¼d., and subtract from the result ⅓ of £16 12s. 6d.

45. Multiply

14 yds. 2 ft. 8 in. by 21,
and £63 14s. 2d. by 17.

46. Find the cost of 64 yards of damask at 4s. 3d. a yard; and if it be made into 6 curtains, find the price of each.

47. Add together seventeen hundred and thirty-eight millions six hundred and four thousand five hundred and thirty-four, 45,947,865, and 9,710,434,050; subtract one thousand and one millions one thousand one hundred and one from the sum, and divide the result by 2079.

48. Find the value of 17 bushels of tares at 1/11, 18 bushels of peas at 3s. 8¼d., 7 qrs. of malt at 21s. 6d., 15 lbs. of hops at 1s. 4¼d., 6 qrs. of oats at 19s. 7d., 14 bushels of beans at 4s. 7d.

49. In 37 crowns as many half-crowns, florins, shillings and pence, how many farthings?

50. Find the value of 17 cwt. 2 qrs. 9 lbs. at 7s. for 3½ lbs.

51. A gentleman divided £4. 18 among 150 school-children, giving the girls a shilling each and the boys sixpence. How many boys and girls were there?

52. If the annual rent of a farm of 312 acres is £245. 14., what is that per acre?

53. What sum must be divided among 39 boys that each may receive 3s. 7¼d.?

54. A grocer bought 74 cwt. of sugar at £2. 15 the cwt. and then mixed with it 6 cwt. of sand; what could he sell the mixture at to gain £18. 15 on the whole?

55. How much Cambric at 12/9¼ a yard can be bought for £33. 16. 10¼?

56. Divide £379. 9. 5¾ among 9 men and 4 women, giving each woman twice as much as a man.

57. Write down in words 270,054, and 200,200,002; and in numbers four millions fifteen thousand and thirty-six, and eighty-four thousand and seven.

58. Multiply £18 14s. 7½d. by 24 and by 24¾, and divide it by 36.

59. A person buys a tub of butter, weighing 3 qrs. 16 lbs. for £4 2s. 6d., the weight of the tub is 10 lbs., how much does the butter cost him per lb.?

60. Divide the continued product of 19, 36, 74 and 124 by 333.

61. How many times does a clock, which strikes the quarters, strike in the course of a year of 365 days?

62. Our National debt amounted in 1864 to £799,802,139 and the population was 23,128,518. Find the average liability.

63. What is the gross taxation per head if the revenue of the Nation is £61,360,749, population as above?

64. An equal number of men and women earned £54. 12s. in 4 weeks, the men receiving 15s., the women 7s. 9d. a week. How many were there of each?

65. If the total force of the British army amounts to 148,242 men, and the cost to £15,060,237 per annum, what is that a head?

66. Multiply four thousand and three millions seven hundred and six thousand and forty-two by thirteen, divide the result by sixty-three and write down in words the value of the answer.

67. Divide £46,651 3s. 5¼d. by 589$\frac{2}{7}$, and reduce the quotient to the decimal of £589$\frac{2}{7}$.

68. A man owned 4 fields, together containing 65 acres 2 roods 8 perches, the fourth was 36 perches greater than the third which was 4477sq. yards greater than either of the others. Find the size of the four fields.

69. From one million take ninety-nine thousand and nine; and take one millionth from one hundred and one thousandths.

70. What is the amount of 9 lbs. 3 oz. 12½ dwt. repeated 6240 times?

71. How much did a person spend in 63 days, who with an annual income of £818. is 90 guineas in debt at the end of a year?

72. Find the cost of 5 cwt. 2 qrs. 24 lbs. at 7½d. per lb., and the weight of 6 waggon-loads, each of which weighs 1 ton 17 cwt. 3 qrs. 3 lbs.

73. Write down in words 104,070,521; and in figures five hundred and four millions thirty thousand four hundred and sixty.

74. Multiply 8 lbs. 7 oz. 19 dwt. 23 grs. by 98, and divide £647 15s. 4¾d. by 392.

75. Reduce 4 roods 39 poles 30 yds. 8 feet to feet, and 8,000,140 drams to tons.

76. Add fifty-seven millions and thirty-seven to four thousand and seventy-six millions one hundred and four thousand and nine hundred; and from the result subtract three thousand eight hundred and seven millions six hundred and twenty thousand and fifty-four, and express the result in words.

77. Multiply 8075 by 647, and find how many times 95 is contained in the result.

78. Multiply the difference between 12 cwt. 3 qrs. 17 lbs. 10 oz., and 5 cwt. 2 qrs. 23 lbs. 11 oz. by 528; and divide their sum by 324.

79. Write down in words 80,040,017, and in figures three thousand two hundred and forty-five millions sixty-eight thousand and eighteen.

80. Divide
23,067 + 175 + 368 + 459 — 52 by 3685 — 3174.

81. What number divided by 35 will give the quotient 38,975 with remainder 17?

82. Multiply
£215 7s. 8¾d. by 196, and divide £189 8s. 10¾d. by 27.

83. Reduce 17 lbs. 3 dwt. 15 grs. to grains, and 1,739,237 drams to tons; also reduce 785,447 square feet to acres.

84. Multiply thirty-seven millions six hundred and fifty-four thousand two hundred and nineteen pounds, seventeen shillings, and sixpence, by 5, 11 and 45; add together the three products and write down the value of the result.

85. Add together MCDXXIX. and three hundred and twenty-eight thousand three hundred and thirty.

86. Find the sum of all prime numbers from 100 to 150, and write the result in Roman characters.

II.

GREATEST COMMON MEASURE.

(α) BY FACTORS.

Find the Greatest Common Measure of:

1. 504 and 540; 3465 and 975.

2. 12584 and 5236; 4655 and 1064; 21168 and 43308.

3. 24750 and 32340; 67375 and 9856; 6855 and 25135.

4. 34870 and 219681; 335664 and 119621250.

5. 22344 and 25648.

6. 14630, 63525 and 7315.

7. 185625, 38115 and 87318.

8. 1230, 4560 and 7890; 196, 350, 728 and 924.

9. 14625, 5005 and 17325.

III.

(β) BY DIVISION.

Find the Greatest Common Measure of:

1. 1653 and 2139; 123349 and 226021.
2. 1258255 and 3870395; 2354016 and 2385264.
3. 11953048 and 11937288; 31122, 51832 and 58311.
4. 229272, 849984 and 1470696.
5. 2701, 703 and 2442; 1729, 5915 and 5096.
6. 843230, 921670 and 1136930.
7. 3937, 16637 and 19177; 1802496 and 2055972.
8. 42435, 195615 and 233910.
9. 96577, 215441, 392863 and 765035.
10. 642746, 727883, 472472 and 557609.
11. 327120430, 336335090 and 396121650.
12. 285714, 714285, 5714280 and 9999990.

IV.

LEAST COMMON MULTIPLE.

(α) BY FACTORS.

Find the Least Common Multiple of:

1. 36 and 45; 63 and 77; 84 and 594; 315 and 15288.
2. 5, 30, 55, 120 and 660; 48, 36, 420, 90 and 2576.
3. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12.
4. 2, 4, 6, 8, 10, 12, 14, 16, 18, 78, 147, 85, 57, 231.
5. 60, 70, 144, 336 and 420; 28, 98, 224, 364, 294.
6. 36, 27, 24, 28, 42, 63, 82, 165.
7. 24, 48, 6, 20, 4, 10, 15, 12, 75.
8. 56, 33, 85, 125, 45, 39, 44.
9. 30, 32, 34, 36, 38, 40, 42, 44.
10. 12, 100, 180, 48, 294, 847, 143, 55, 56.
11. 49, 52, 54, 66, 72, 90, 98, 102, 110.

12. 156, 65, 273 and 390; 174, 178, 435, 445.
13. 252, 126, 105, 294, 84, 63.
14. 4½, 7, 6, 10½, 25½, 34.
15. 133126875, 3937248, 30030.
16. 285714, 571428, 111111, 428571.

V.

LEAST COMMON MULTIPLE.

(β) BY DIVISION.

Find the Least Common Multiple:

1. 79587 and 658923.
2. 96528 and 241320; 64808 and 607575.
3. 76875 and 12177; 1041007 and 14640625.
4. 106234128 and 55032978.
5. 47236608 and 72601200.
6. 744975 and 7509950.
7. 703 and 1387; 205495 and 238345.
8. 450, 510, 867, 819, 1023.
9. 1643, 1085 and 2728; 736, 713 and 690.
10. 1269002, 1267875 and 1252097.
11. 11222211 and 11970358400.
12. 493, 464, 899 and 435.
13. 483, 462, 399 and 420.
14. 780, 765 and 555.

VI.

MISCELLANEOUS EXAMPLES IN MEASURES, MULTIPLES AND THE ELEMENTARY PROPERTIES OF NUMBERS.

1. Find the greatest weight in which 9 tons 13 cwt. 2 qrs. and 17 tons 14 cwt. 3 qrs. 8 lbs. can be exactly expressed.

2. Shew that a number is divisible by 99 if the sum of the digits in the odd places + 10 times the sum of those in the even is divisible by 99.

3. What is the greatest coin in which £88. 2. 6, £199. 10 and £121. 17. 6 could all be paid, and what the least amount that could be paid either in three-penny, four-penny, six-penny, seven-and-six-penny, half-guinea, or guinea pieces?

4. Shew that all prime numbers greater than 3 are divisible by 6 if unity be added from them or else subtracted.

5. Find the G. C. M. of 3116295 and 9883705 only once dividing.

6. The G. C. M. of two square numbers is the square of the G. C. M. of their roots.

7. Shew that the product of any two factors contains either as many figures as there are together in the two factors, or one less.

8. Find the two shortest rods whose lengths can be exactly measured by strings, one-third of a yard, one-half of a yard, two-thirds of a yard, 2 yds., and 5½ yds. long.

9. In how many ways can two rods, respectively 49 yds. 7 inches, and 31 yards 11 inches long, be both cut into exactly equal lengths and how long will the greatest be?

10. Find the G. C. M. of 412391 and 287609 only once dividing.

11. From any prime another number is formed by adding a figure to the right of the unit digit; shew that 9 will not be a measure of the difference of the two numbers unless the figure added is nine or zero, and 11 will not be a measure of their sum unless the figure added is zero.

12. All prime numbers are divisible by 4 either if

unity is added or if subtracted from them; shew that the converse is not true.

13. The sum of three numbers is 871 and the G. C. M. of the first and third 39; find the G. C. M. of the three.

14. Find the G. C. M. of 1592902831 and 2892915831 only once dividing.

15. If the first digit of a multiple of 4 is 2 or 6, the second must be odd, if 4 or 8, even.

16. Shew that in the process for finding the G. C. M. of two numbers the final remainder will be unity if any remainder is a prime number and not a factor of the preceding remainder.

17. Find the G. C. M. of 8519361 and 8502341 without any division at all.

18. Find the greatest weight which will measure both pounds Avoirdupois and pounds Troy.

19. A lad read through the Iliad (15697 lines) in exactly the same number of days as another the Æneid (9900 lines); if they read uniformly, what were their respective tasks each day?

20. If two numbers are divided by the same number, shew that the difference between the products of the dividends and the products of the remainders is divisible by that number.

21. A tesselated pavement 59 ft. 7 in. by 58 ft. 9 in. consists of square blocks; find their greatest possible size.

22. If a number is divisible by 6, the sum of the unit figure and 4 times each of the others is divisible by 6.

23. Three fives courts 17 ft. 3 in. by 5 ft. 3 in., 21 ft. 1 in. by 7 ft. 7 in. and 24 ft. 11 in. by 9 ft. 11 in. are to be paved with rectangular stones uniformly placed all of the same size and shape; find the number of stones required.

24. In every division the dividend is greater than twice the remainder.

25. A number is prime if not divisible by any of the primes whose squares are less than the number.

26. The product of any three consecutive numbers is divisible by 6.

27. Find the least number of half-guineas which can be paid either in four-penny pieces or half-crowns.

28. Find the least weight which can be expressed in terms of pounds Avoirdupois or pounds Troy.

29. Find the shortest distance that can be measured either by statute miles or geographical miles.

30. The square of every prime greater than 3 is, if diminished by 1, a multiple of 24.

31. The G. C. M. of two numbers A and B is equal to the number of multiples of B contained in the series: A, 2 A, 3 A, 4 A, ... A×B.

32. Shew that every common measure of 999999 and either of the following: 237699, 376992, 769923, 699237, 992376, 923679 will divide all the rest, and that the sum of these six is divisible by the sum of the digits of the first.

33. Shew that the L. C. M. of three numbers equals the product of the numbers by their G. C. M. divided by the product of the G. C. Measures of every two.

34. Shew that a number of not less than four digits is divisible by 7, if when divided by 1000, the quotient either equals the remainder or when added to it is divisible by 7.

VII.

FRACTIONS.

I. Reduce to their lowest terms:

1. $\frac{252}{396}$, $\frac{616}{728}$, $\frac{1001}{1155}$, $\frac{348}{522}$, $\frac{2044}{4599}$, $\frac{2387}{3069}$, $\frac{3088}{5404}$.

2. $\frac{6204}{14058}$, $\frac{282375}{278625}$, $\frac{1829871}{18300042}$, $\frac{8019}{10692}$, $\frac{5369}{14573}$.

3. $\frac{176709}{176906}$, $\frac{699678}{836652}$, $\frac{52272}{69696}$, $\frac{47432}{101640}$.
4. $\frac{245385269}{426763565}$, $\frac{176709}{870987}$, $\frac{22365}{141669}$, $\frac{14997}{24995}$.
5. $\frac{32967}{999999}$, $\frac{948717}{999999}$, $\frac{62558}{66594}$, $\frac{96833}{440150}$.
6. $\frac{118881}{142857}$, $\frac{538461}{999999}$, $\frac{384615}{999999}$, $\frac{272727}{6999993}$.
7. $\frac{47619}{1999998}$, $\frac{385056}{715104}$, $\frac{4116112}{6332480}$, $\frac{263403}{519687}$.
8. $\frac{5184}{6912}$, $\frac{243936}{256608}$, $\frac{8338176}{11197504}$, $\frac{18928}{21840}$.

II. Reduce to whole or mixed numbers:

1. $\frac{37}{3}$, $\frac{144}{10}$, $\frac{391}{28}$, $\frac{355}{113}$, $\frac{737}{7}$, $\frac{308}{10}$.
2. $\frac{2516}{13}$, $\frac{427}{11}$, $\frac{349}{17}$, $\frac{840}{15}$, $\frac{3623}{49}$.
3. $\frac{446}{24}$, $\frac{5094}{6}$, $\frac{100000}{111}$, $\frac{4791}{31}$.
4. $\frac{684}{19}$, $\frac{83564}{3071}$, $\frac{430530}{709}$, $\frac{374722}{371}$.
5. $\frac{290209}{29}$, $\frac{9999}{347}$, $\frac{57142800}{999999}$, $\frac{908345}{7816}$.

III. Reduce to improper Fractions:

1. $4\frac{3}{7}$, $11\frac{2}{3}$, $19\frac{1}{11}$, $37\frac{16}{17}$, $39\frac{23}{24}$, $10\frac{10}{11}$, $12\frac{5}{6}$.
2. $74\frac{165}{166}$, $99\frac{795}{796}$, $371\frac{101}{423}$, $531\frac{4}{5}$, $23\frac{5}{37}$.
3. $37\frac{2}{17}$, $894\frac{3}{80}$, $10\frac{1137}{1138}$, $61\frac{83}{191}$, $1290\frac{81}{371}$.
4. $11\frac{7163}{8163}$, $399\frac{1437}{1438}$, $7\frac{33}{199}$, $1\frac{1}{1000}$, $10\frac{11}{1001}$.
5. $70\frac{117}{584}$, $10\frac{999}{1000}$, $19\frac{123}{234}$, $95\frac{95}{99}$, $1111\frac{1000}{1111}$.

IV. Reduce to simple Fractions:

1. $\frac{7}{25}$ of $\frac{15}{28}$, $\frac{3}{7}$ of $\frac{5}{6}$ of $\frac{21}{55}$.
2. 15 of $\frac{7}{45}$, $\frac{1}{2}$ of $\frac{8}{11}$ of $\frac{121}{28}$.
3. 3 of $\frac{1}{4}$ of $\frac{2}{15}$, $\frac{4}{7}$ of $\frac{5}{11}$ of $\frac{21}{24}$.
4. $2\frac{1}{2}$ of 2 of $\frac{1}{5}$, $\frac{1}{3}$ of 2 of $\frac{6}{7}$.
5. $\frac{3}{4}$ of $4\frac{1}{6}$ of $\frac{6}{7}$, $\frac{5}{9}$ of $2\frac{1}{4}$ of $\frac{2}{15}$.
6. $\frac{9}{17}$ of $3\frac{1}{4}$ of $5\frac{2}{3}$ of $\frac{3}{13}$ of 11.
7. $2\frac{1}{7}$ of $5\frac{1}{7}$ of 4 of $3\frac{1}{9}$ of $1\frac{3}{4}$.
8. $1\frac{1}{2}$ of $7\frac{1}{8}$ of $1\frac{1}{7}$ of $\frac{1}{19}$ of $2\frac{1}{2}$.
9. $\frac{121}{133}$ of $2\frac{2}{11}$ of $1\frac{7}{12}$ of $\frac{13}{11}$ of 7.
10. $\dfrac{35\frac{1}{3}}{176\frac{2}{3}}$ of $\dfrac{27\frac{3}{11}}{109\frac{1}{11}}$ of $\frac{1}{11}$ of $\frac{132}{12}$.
11. $\frac{2}{3}$ of 4 of $\frac{5}{8}$ of $\frac{3}{2}$ of 1.
12. $\frac{3}{7}$ of $\frac{4}{5}$ of $\frac{7}{12}$ of 5.
13. $\frac{1}{3}$ of $\frac{33}{17}$ of $\frac{1}{5}$ of 85.

V. Reduce to their Least Common Denominators:

1. $\frac{2}{3}, \frac{5}{6}$; $\frac{6}{7}, 3, \frac{1}{21}$; $\frac{1}{2}, \frac{7}{15}, \frac{9}{10}, 10$.
2. $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$.
3. $\frac{7}{11}, 3, \frac{13}{7}, \frac{5}{12}, \frac{3}{5}$.
4. $\frac{9}{16}, \frac{10}{11}, 1, \frac{1}{30}, \frac{4}{28}, \frac{19}{33}$.
5. $\frac{5}{14}, 5, \frac{7}{44}, \frac{1}{35}, \frac{13}{275}$.
6. $\frac{7}{16}, \frac{1}{84}, \frac{1}{35}, 10, \frac{23}{42}$.
7. $\frac{4}{11}, \frac{3}{407}, \frac{3}{37}, \frac{17}{22}, \frac{1}{74}$.
8. $\frac{5}{36}, \frac{19}{75}, \frac{27}{48}, \frac{31}{60}, \frac{1}{9}$.
9. $\frac{5}{6}, \frac{6}{7}, \frac{4}{9}, \frac{1}{28}, \frac{17}{54}$.
10. $\frac{17}{39}, \frac{13}{26}, \frac{1}{6}, \frac{11}{15}$.

VI. Find the value of:

1. $\frac{3}{7} + \frac{6}{7} + 1\frac{2}{7} + \frac{1}{7} + 3\frac{5}{7} + 4$.
2. $\frac{14}{33} + \frac{17}{22} + 1$; $\frac{5}{24} + 2 + 3\frac{7}{15} + \frac{3}{40}$.
3. $\frac{5}{18} + \frac{7}{45} + 4 + 7\frac{7}{30}$; $\frac{3}{10} + 10 + \frac{3}{100}$.
4. $\frac{1}{2} + \frac{1}{3} + \frac{1}{6} + \frac{4}{9} + \frac{3}{5} + \frac{1}{15}$.
5. $\frac{7}{18} + \frac{1}{25} + \frac{1}{120} + \frac{7}{24} + \frac{8}{15} + \frac{1}{100} + \frac{23}{40} + \frac{11}{27}$.
6. $7 + \frac{7}{10} + \frac{7}{100} + \frac{7}{1000} + \frac{7}{10000} + \frac{7}{100000}$.
7. $2\frac{1}{2} + 3\frac{2}{3} + 4\frac{3}{4} + 5\frac{4}{5} + 6\frac{5}{6} + 9\frac{9}{10}$.
8. $1\frac{1}{2} + 3\frac{3}{4} + 5\frac{5}{6} + 7\frac{7}{8} + 9\frac{9}{10} + 11\frac{11}{12}$.
9. $\frac{3}{4} + \frac{11}{480} + \frac{13}{16} + \frac{1}{120} + \frac{13}{32}$.
10. $3\frac{1}{15} + \frac{9}{200} + 4\frac{17}{25} + \frac{1}{60} + 1\frac{13}{45} + 11\frac{11}{72} + 4\frac{1}{6}$.
11. $\frac{2}{13} + \frac{7}{31} + 17\frac{4}{13} + 7\frac{20}{31} + \frac{7}{13} + 9\frac{4}{31}$.
12. $4\frac{3}{4} + \frac{16}{37} + 5\frac{3}{5} + 16\frac{1}{74} + 2\frac{47}{185}$.
13. $3\frac{4}{5} + 16 + \frac{5}{8} + \frac{37}{25} + 1\frac{19}{40} + 7\frac{3}{25}$.
14. $9\frac{181}{245} + \frac{4}{49} + 37\frac{151}{175} + \frac{1}{560} + 1\frac{13}{1225} + \frac{21}{80} + 3\frac{9}{98}$.
15. $\dfrac{2\frac{1}{2}}{17} + \dfrac{3\frac{1}{5}}{22\frac{2}{3}} + \dfrac{2\frac{1}{5}}{13\frac{3}{5}}$.
16. ${}^{1}\frac{1}{4}{}^{3} + \frac{3}{7}$ of $1\frac{5}{9} + \dfrac{38\frac{3}{11}}{5\frac{5}{11}} + 4\frac{1}{6}$ of $1\frac{1}{5}$.
17. $1\frac{3}{8}$ of $\frac{3}{4} + 1\frac{5}{32} + 1\frac{2}{5}$ of $1\frac{3}{8} + \frac{1}{80}$.
18. $11\frac{11}{17} + 17\frac{21}{34} + \frac{15}{51} + \frac{1}{3}$ of $\frac{2}{17}$ of $8 + \frac{1}{17}$ of $\frac{1}{3}$
$+ \frac{1}{3}$ of $2\frac{3}{4} + \frac{15}{34}$.

19. $\frac{3}{4}$ of $\frac{1}{5} + 1\frac{4}{5} + \frac{3}{4} + 3\frac{7}{10} + 9\frac{1}{2}$.

20. $9\frac{1\frac{1}{4}}{3\frac{1}{2}} + \frac{6\frac{1}{3}}{2\frac{5}{7}} + \frac{73}{6} + 4 + \frac{12\frac{5}{12}}{74\frac{1}{2}}$.

21. $\frac{23}{7} + \frac{17}{35} + 11 + \frac{3}{10} + 3\frac{11}{14}$.

22. $5\frac{1}{2} + 4\frac{3}{5} + 7\frac{2}{3} + 3 + 5\frac{5}{6} + \frac{11}{15}$.

23. $2\frac{\frac{3}{4} \text{ of } 5\frac{1}{3}}{\frac{4}{5} \text{ of } 6\frac{1}{4}} + 3\frac{7}{15} + \frac{\frac{2}{9} \text{ of } \frac{7}{8}}{\frac{5}{12} \text{ of } \frac{2}{11}}$

24. $\frac{1}{4} + \frac{3}{8} + \frac{5}{16} + \frac{7}{32} + \frac{11}{64}$.

25. $\frac{2}{3} + \frac{5}{3\times7} + \frac{4}{3\times7\times11} + \frac{13}{3\times7\times11\times5}$.

26. $\frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \frac{16}{81} + \frac{17}{243}$.

VII. Find the value of:

1. $3 - \frac{4}{7}$, $2 - \frac{5}{6}$, $17 - \frac{1}{9}$, $19 - \frac{3}{11}$.
2. $\frac{7}{11} - \frac{2}{11}$, $\frac{4}{5} - \frac{3}{4}$, $3\frac{4}{7} - 2\frac{6}{7}$, $\frac{4}{13} - \frac{7}{65}$.
3. $18 - \frac{6}{7}$, $9\frac{7}{11} - 7$, $\frac{1}{4} - \frac{1}{25}$, $\frac{5}{8} - \frac{7}{15}$.
4. $5\frac{4}{5} - 4\frac{5}{6}$, $13 - 9\frac{4}{13}$, $16\frac{4}{35} - 14\frac{9}{28}$.
5. $\frac{1}{34} - \frac{1}{35}$, $17\frac{4}{29} - 7\frac{5}{29}$, $19\frac{7}{31} - 7\frac{19}{31}$.
6. $13\frac{7}{37} - 9\frac{7}{31}$, $43\frac{6}{11} - 37\frac{7}{12}$, $\frac{44}{111} - \frac{1}{3}$.
7. $19 - \frac{4}{137}$, $\frac{13}{45} - \frac{13}{47}$, $13\frac{12}{13} - 9\frac{30}{31}$.
8. $117\frac{34}{35} - 98\frac{271}{280}$, $72\frac{8}{9} - 72\frac{7}{8}$.
9. $15 - \frac{3}{19}$ of $4\frac{3}{4}$, $\frac{5}{43} - \frac{5}{47}$, $31\frac{1}{31} - \frac{30}{31}$.
10. $\frac{3}{37} - \frac{3}{41}$, $23\frac{5}{81} - 17\frac{11}{45}$, $27\frac{157}{961} - \frac{957}{961}$.
11. $\frac{3}{4}$ of $\frac{8}{9} - \frac{3}{8}$ of $\frac{4}{9}$, $\frac{1}{2} - \frac{3}{13}$ of $1\frac{6}{7}$.
12. $3\frac{7}{25} - 3\frac{5}{21}$ of $\frac{1}{17}$, $\frac{3}{5}$ of $\frac{2}{7}$ of $28 - \frac{4}{5}$ of $\frac{5}{9}$ of 3.
13. $14\frac{14}{95}$ of $\frac{1}{5\frac{3}{5}} - 1\frac{21}{23}$ of $\frac{2}{3}$ of $1\frac{10}{11}$.
14. $\frac{11}{49}$ of $\frac{13}{85}$ of $23\frac{4}{5}$ of $\frac{7}{5} - \frac{1}{8}$ of $\frac{5}{6}$ of $9\frac{3}{4}$.

VIII. Find the value of:

1. $13\frac{1}{30} - \frac{11}{18} - 1\frac{1}{8} + \frac{5}{6} + \frac{1}{12} + 1\frac{5}{18} + \frac{1}{120}$.
2. $3\frac{1}{2} - 4\frac{1}{3} + 5\frac{1}{4} - 6\frac{1}{5} + 7\frac{1}{8}$.
3. $\frac{3}{8} - 2\frac{1}{2} + 5\frac{5}{32} - 3 + 1\frac{3}{4} - \frac{17}{32}$.
4. $1 - 5\frac{17}{36} + 2\frac{5}{13} + 137\frac{19}{52} - \frac{19}{36}$.
5. $101\frac{23}{24} - 19\frac{35}{36} + 1\frac{15}{16} + 127\frac{63}{64} - 7\frac{47}{48}$.
6. $3\frac{4}{5} - 6\frac{7}{8} + 9\frac{10}{11} + 12\frac{13}{14} - 15\frac{75}{77}$.
7. $4\frac{2}{51} - 11\frac{8}{17} + 141\frac{4}{15} - 16\frac{37}{85} - \frac{1}{5}$.

8. $7\frac{6}{7} + 1 - 5\frac{3}{35} + 2\frac{17}{14} - \frac{9}{10}$.
9. $13\frac{2}{143} - 8\frac{7}{11} + 7\frac{8}{11} + 1\frac{11}{13} - 3\frac{13}{11}$.
10. $3\frac{4}{5} - 2\frac{1}{7} + 3\frac{1}{6} - (3\frac{2}{3} - 1\frac{1}{7}) + (5\frac{1}{6} - 2\frac{1}{3})$.
11. $\frac{1}{65} + 117\frac{5}{39} - (17\frac{2}{13} + \frac{1}{195}) - (315\frac{3}{5} - \frac{4}{13}) + 219\frac{30}{91} - \frac{2}{91}$.
12. $2\frac{3}{5} - 9\frac{7}{8} + (12\frac{23}{28} + \frac{1}{20}) + 4\frac{3}{10} - (9\frac{27}{35} - 5\frac{7}{8})$.
13. $4\frac{3}{8} + 11\frac{1}{22} - (13\frac{1}{16} - 9\frac{29}{88} - 3\frac{1}{12}) - (31\frac{17}{32} - 29\frac{7}{24})$.
14. $9\frac{4}{11} + 3\frac{1}{2} - (8\frac{3}{37} + 17\frac{17}{22}) + 13\frac{1}{74} + 6\frac{9}{407}$.
15. $7\frac{17}{39} - 3\frac{13}{26} - (9\frac{11}{15} + \frac{4}{39} - 6\frac{1}{6})$.

IX. Find the value of:

1. $\frac{2}{9} \times \frac{3}{8}$; $\frac{28}{45} \times \frac{99}{56}$; $\frac{15}{32} \times \frac{112}{135}$.
2. $\frac{24}{35} \times \frac{75}{28} \times \frac{91}{117}$; $4\frac{1}{2} \times \frac{1}{3} \times 1\frac{1}{3}$.
3. $2\frac{1}{2} \times \frac{18}{35} \times 3\frac{1}{3} \times \frac{14}{15}$.
4. $\frac{4}{5} \times 1$; $\frac{4}{5} \times \frac{4}{5}$; $\frac{4}{5} \times \frac{3}{4} \times \frac{5}{6}$; $\frac{4}{5} \times 3$.
5. $\frac{1}{91} \times 4 \times 4\frac{16}{45} \times 8\frac{1}{8} \times \frac{3}{7}$.
6. $3\frac{13}{81} \times \frac{1}{38} \times 3 \times 1\frac{31}{32} \times 2\frac{1}{28}$.
7. $25\frac{16}{35} \times \frac{1}{22} \times 10\frac{1}{2} \times 2\frac{1}{2}$.
8. $32674 \times 19\frac{3}{4}$, $31\frac{7}{11}$, $23\frac{23}{32}$.
9. $121\frac{1}{2} \times 18$, $37\frac{1}{2}$, $121\frac{1}{2}$.
10. $(3\frac{1}{2} + 2\frac{1}{4} - 1\frac{3}{4}) \times (3\frac{1}{2} - 2\frac{1}{4} + 1\frac{3}{4}) \times 2\frac{1}{4}$.
11. $2791\frac{221}{280} \times 36\frac{5}{6}$, $25\frac{25}{42}$, $280\frac{140}{221}$.
12. $\frac{209}{336} \times 4\frac{54}{95} \times \frac{1344}{1536} \times 3\frac{222}{341} \times 10 \times 5\frac{203}{415}$.
13. $22849\frac{23}{28} \times 411\frac{13}{17}$, $1\frac{19}{65}$, $139\frac{191}{193}$.
14. $\frac{36}{1092} \times \frac{924}{315} \times \frac{1435}{4059} \times 3\frac{1}{4}$.
15. $\left\{4\frac{1}{12} - (5\frac{1}{7} - 2\frac{1}{3}) + \frac{1}{21}\right\} \times (\frac{35}{37} + 3\frac{1}{2}) + \frac{1}{8}$.
16. $\frac{21}{238} \times 5\frac{20}{43} \times \frac{301}{979} \times 4\frac{38}{91} \times \frac{104}{1565} \times 3\frac{59}{1128} \times 5\frac{2}{3} \times 9\frac{20}{67}$.
17. $108\frac{6}{17} \times 131\frac{11}{17}$; $4664\frac{4}{13} \times 418\frac{29}{31}$.
18. $(2 - \frac{8}{19}) \times 1\frac{24}{375} \times (1 + \frac{56}{819}) \times (2 - \frac{1551}{1575}) \times \frac{9}{41}$.
19. $(13\frac{1}{2} - 11\frac{4}{7}) \times (5\frac{2}{3} - 2\frac{1}{15} - 3\frac{2}{45}) \times (2\frac{1}{5} + 3\frac{3}{4}) \times \frac{2}{17}$.

X. Find the value of:

1. $\frac{36}{49} \div \frac{9}{7}$; $\frac{11}{84} \div \frac{5}{12}$; $1\frac{4}{91} \div (1 - \frac{1}{39})$.
2. $1\frac{41}{55} \div \frac{144}{85}$; $1\frac{42}{143} \div \frac{999}{1001}$.
3. $9\frac{53}{54} \div 3\frac{2}{3}$; $127\frac{2}{7} \div 3$; $\frac{16}{35} \div \frac{4}{7}$.
4. $343\frac{71}{91} \div 57\frac{29}{35}$; $\frac{18}{25} \div \frac{3}{5}$.
5. $\frac{2}{3} \div \frac{4}{9}$; $3\frac{1}{4} \div 4\frac{1}{3}$; $1 \div \frac{2}{3}$ of $\frac{4}{5}$.
6. $\frac{3}{5}$ of $\frac{7}{9} \div \frac{2\frac{3}{5}}{3\frac{2}{5}}$ of $\frac{2\frac{3}{7}}{1\frac{6}{7}}$ of $1\frac{2}{5}$.
7. $17348 \div \frac{6}{7}$, $\frac{7}{6}$, $4\frac{2}{11}$, $317\frac{7}{12}$.
8. $2983\frac{53}{99} \div \frac{625}{999}$, 7, $11\frac{7}{66}$.
9. $\frac{27}{45} \div \frac{3}{5}$; $1 \div \frac{19}{37}$; $10 \div 12\frac{6}{7}$; $\frac{77}{108} \div \frac{7}{12}$.
10. $23\frac{2}{5} \div 3\frac{1}{4}$; $\frac{13}{17} \div \frac{17}{13}$, $\frac{13}{16}$; $\frac{187}{228} \div \frac{11}{12}$, $1\frac{5}{12}$, $1\frac{15}{19}$.
11. $365 \div 365\frac{1}{4}$; $\frac{2}{3}$ of $1\frac{4}{7}$ of $2\frac{1}{4} \div 2\frac{3}{4}$ of $\frac{3}{7}$.
12. $3\frac{2}{5}$ of $\frac{3}{8}$ of $\frac{11}{49} \div 1\frac{16}{50}$ of $(2\frac{3}{7} \times 1\frac{3}{8})$.
13. $\frac{4}{11}$ of $4\frac{3}{7}$ of $\frac{1}{1\frac{8}{9}} \div 3\frac{4}{9}$ of $1\frac{47}{77}$ of $\frac{1}{4\frac{3}{7}}$.
14. $\frac{3}{7}$ of $\frac{7}{1} \div \frac{2}{3}$ of $1\frac{1}{8}$; $365\frac{1}{4} \div 365$.
15. $\frac{1}{5}$ of 4 of $\frac{3}{17}$ of $7\frac{1}{12} \div \frac{4}{15}$ of $\frac{9}{21}$ of $\frac{5}{8}$ of 7.
16. $25 \div \frac{5}{27}$ of $\frac{1}{35}$ of $\frac{1}{21}$ of $110\frac{2}{5}$ of $55\frac{1}{8}$.
17. $\frac{1\frac{5}{12}}{1\frac{8}{9}} \div \frac{21}{16}$ of $\frac{28}{11\frac{2}{3}}$; $3\frac{6}{7} \times 3\frac{8}{9} \div 2\frac{1}{12}$ of $3\frac{3}{5}$.
18. $110\frac{118}{259} \div 7\frac{421}{1813}$; $3\frac{6}{35} \times 9\frac{6}{7} \div 2\frac{17}{95}$ of $1\frac{8}{49}$.
19. $3483\frac{1313}{16614} \div 3\frac{64207}{132912}$.

XI. Reduce to their simplest forms:

1. $\frac{2 + \frac{1}{2}}{2 - \frac{1}{2}}$, $\frac{14\frac{3}{4} - 13\frac{2}{3}}{14\frac{3}{4} + 13\frac{2}{3}}$, $\frac{9\frac{5}{6}}{6\frac{5}{9}}$.
2. $\frac{3\frac{8}{9}}{25\frac{2}{3}}$, $\frac{\frac{14}{3}}{\frac{21}{2}}$, $\frac{2\frac{1}{3}}{3\frac{1}{4}}$ of $\frac{1}{2\frac{2}{13}}$.
3. $1\frac{1}{2} + \frac{1}{2}$ of $\frac{2\frac{1}{3} - \frac{1}{3} \text{ of } 5}{2\frac{1}{3} + \frac{1}{3} \text{ of } 5}$.
4. $8 - 8 \times \frac{2\frac{1}{5} - 1\frac{2}{7}}{2 - \frac{1}{6 - \frac{1}{6}}}$.
5. $\frac{5\frac{5}{6}}{7\frac{7}{8}}$ of $3 \times \frac{1 - \frac{1}{10}}{7\frac{7}{8} - 5\frac{5}{6}}$.

6. $\dfrac{2\frac{1}{2}}{2\frac{1}{2} \times 3\frac{1}{3}} \div \dfrac{1}{2\frac{1}{3}} \times \dfrac{2\frac{1}{2} + 3\frac{1}{4} \times 4\frac{1}{3}}{2\frac{1}{2} \times 3\frac{1}{4} + \frac{1}{6}}$.

7. $\dfrac{4\frac{1}{5} \times 2\frac{1}{7} - 4\frac{1}{9}}{(4\frac{1}{5} \times 2\frac{1}{7} - 4)\frac{1}{9}}$; $\dfrac{7\frac{1}{9} \times 7\frac{1}{9} - 1}{7\frac{1}{9} - 1}$.

8. $\dfrac{1\frac{3}{4} \text{ of } 1\frac{4}{5} \text{ of } \frac{1}{3}}{1\frac{3}{4} + 1\frac{4}{5} - 3}$; $\dfrac{9\frac{1}{12} \times 9\frac{1}{12} - 9}{9\frac{1}{12} + 3}$.

9. $\frac{5}{7}$ of $\dfrac{2 - \frac{5}{6} \text{ of } \frac{3}{7} + \frac{4}{7}}{2 \times \frac{5}{6} \times \frac{3}{7} \times \frac{4}{7}}$; $\frac{1}{3} \cdot \dfrac{1 - \frac{1}{3}}{2} \cdot \dfrac{2 - \frac{2}{3}}{4}$.

10. $\dfrac{2\frac{1}{2} \times 2\frac{1}{2} \times 2\frac{1}{2} - 2 \times 2 \times 2}{2\frac{1}{2} \times 2\frac{1}{2} + 2\frac{1}{2} \times 2 + 2 \times 2}$, $\dfrac{3}{4 + \frac{5}{6} + \frac{7}{8}}$.

11. $\frac{1}{5} + \frac{1}{6} \div \frac{1}{7} - \frac{1}{7} \times \frac{1}{8} - \frac{1}{8}$.

12. $3 \; \dfrac{\frac{1}{3} - \frac{1}{4}}{\frac{1}{3} + \frac{1}{4}}$ of $\dfrac{3\frac{1}{12}}{3\frac{1}{7}} \div \dfrac{12\frac{1}{3}}{7\frac{1}{3}}$.

13. $3\frac{1}{2} + \frac{1}{2} \times \dfrac{2\frac{1}{5} - 1\frac{1}{6}}{3\frac{5}{6} - 2\frac{4}{5}}$.

14. $\dfrac{3}{1 + \frac{1}{2} + \frac{1}{2}}$, $\dfrac{2}{2 + \frac{1}{3} + \frac{1}{4}}$.

15. $$\frac{(9\frac{1}{2} + 1\frac{7}{12} - 8\frac{35}{36}) \div 4\frac{3}{4} \text{ of } \frac{2}{7}}{\frac{4}{43} + \cfrac{1}{11 + \cfrac{1}{2 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \frac{1}{2}}}}}}}}.$$

16. $\dfrac{\frac{1}{3} \text{ of } 1\frac{3}{4} \text{ of } 1\frac{4}{5}}{1\frac{3}{4} \text{ of } 1\frac{4}{5} - 3}$; $(\frac{1}{3} + \frac{1}{4}) \div \frac{1}{5}$.

17. $\frac{1}{6} \times (\frac{1}{7} - \frac{1}{8}) \div \frac{1}{9 \times 8}$; $22 - \dfrac{1}{1 + \frac{4}{27} + \frac{1}{4}}$ of 25.

18. $(\frac{1}{5} + \frac{1}{6}) \times (\frac{1}{5} - \frac{1}{6}) + (\frac{1}{6} + \frac{1}{7}) \times (\frac{1}{6} - \frac{1}{7})$,
$(\frac{1}{5} + \frac{1}{6}) \times (\frac{1}{6} - \frac{1}{7}) \div (\frac{1}{8} - \frac{1}{9})$.

19. $\left\{(\frac{1}{5} + \frac{1}{6}) \times \frac{1}{5} - \frac{1}{6} - \left\{(\frac{1}{6} + \frac{1}{7}) \times \frac{1}{7} - \frac{1}{7}\right\}\right\} \div \frac{1}{5 \times 6 \times 7}$.

20. $\dfrac{1\frac{3}{4} - 1\frac{1}{5} \text{ of } 3\frac{1}{4} + 3\frac{1}{4} \div 4\frac{1}{3} + 5\frac{3}{5}}{(2\frac{1}{3} + 3\frac{1}{2}) \div 4\frac{3}{4} + \frac{5}{8} \times (3\frac{1}{2} - 2\frac{1}{3}) \div 1\frac{3}{4}}$.

21. $$\frac{1\frac{1}{1}\times 2\frac{1}{2}\div 3\frac{1}{3}-\cfrac{1\frac{1}{2}}{1+\cfrac{1}{1+\frac{1}{4}}}}{1\times 2\frac{1}{2}\div 3\frac{2}{3}-(1+2\frac{1}{2})\div 3\frac{2}{3}\text{ of }7}-\frac{(\frac{1}{2})^2-(\frac{1}{3})^2}{3^2-2^2}\times 2.$$

22. $$\frac{3\frac{1}{3}+2\frac{2}{3}\text{ of }8\frac{5}{8}-3\frac{5}{8}\text{ of }5\frac{1}{3}}{7-\frac{1}{3}\text{ of }4\frac{1}{5}\text{ of }\left\{\frac{\frac{1}{3}+\frac{1}{4}}{\frac{1}{4}-\frac{1}{6}}-\frac{3\frac{1}{2}}{2\frac{1}{3}}\div\frac{1\frac{4}{5}}{4\frac{2}{5}}\right\}}.$$

23. $$\frac{2\frac{1}{2}+5\frac{1}{5}}{\frac{1}{2}+\frac{1}{5}}\div(\frac{1}{2}+\frac{1}{5})-1\frac{3}{14}-\frac{11}{14}\text{ of }\frac{5\frac{1}{5}-2\frac{1}{2}}{\frac{1}{2}-\frac{1}{5}}.$$

24. $$\frac{(2\frac{15}{16}-7\frac{24}{25}+8\frac{79}{80}-3\frac{19}{20})\text{ of }7\frac{1}{7}}{(\frac{1}{2}-\frac{1}{3}+\frac{1}{4})(\frac{1}{5}-\frac{1}{6}+\frac{1}{7})\div(\frac{1}{8}-\frac{1}{9}+\frac{1}{10})-\cfrac{\frac{1}{2}}{7-\frac{1}{6}}}.$$

25. $$\frac{\cfrac{1}{10+\cfrac{1}{1+\frac{1}{5}}}-\left(2-\cfrac{4}{2+\cfrac{1}{10+\frac{1}{3}}}\right)\div(1+\frac{7}{8}\text{ of }1\frac{1}{31})}{1-\frac{3\times 10}{3+10}\text{ of }\left\{2+\frac{3}{10}\text{ of }\frac{6+\frac{1}{10}}{6-\frac{1}{10}}\div 3\right\}\text{ of }\frac{1}{5}}.$$

XII. Find the value of:

1. $\frac{4}{5}$ of a £; $\frac{7}{9}$ of 30/.; $\frac{5}{12}$ of 3/9; $\frac{3}{4}$ of 2/6.
2. $\frac{197}{384}$ of a lb. Troy; $\frac{11}{15}$ of 3 oz. 5 dwt.; $5\frac{17}{48}$ of 7 oz. 9 dwt.
3. $1\frac{255}{1792}$ of a ton; $\frac{19}{56}$ of 2 cwt.; $\frac{8617}{7168}$ of $3\frac{1}{2}$ qrs.
4. $2\frac{119}{495}$ of a mile; $1\frac{7923}{8448}$ of 4 fur.; $\frac{7}{198}$ of 7 poles.
5. $3\frac{211}{256}$ of 5 qrs. of corn, $\frac{17}{168}$ of a pipe of wine; $\frac{3}{4}$ of a bushel.
6. $7\frac{14}{33}$ of an acre; $5\frac{31}{72}$ of 11 cubic yards.
7. $\frac{11}{43}$ of £1. 19. 5.; £8. 6. $1\frac{1}{4}\div\frac{17}{25}$.
8. $1\frac{8}{9}$ of £3. 0. $6\frac{3}{4}$.; $2\frac{1}{4}$ of $1\frac{1}{3}$ of £37. 7.
9. $\left\{1\frac{1}{8}-\frac{1}{4}\text{ of }\frac{3}{4}\right\}$ of 12/8; £1. 5. 3. × $5\frac{5}{12}$.
10. $\left\{2\frac{13}{14}+3\frac{5}{21}\text{ of }6\frac{3}{4}\text{ of }\frac{1}{3}-3\frac{6}{7}\right\}$ of 3 cwt. 3 qrs. 14 lbs.
11. $2\frac{1}{7}$ of 1/9 + $6\frac{2}{3}$ of $5\frac{1}{7}$ of $10\frac{1}{2}$d. — $\frac{3}{7}$ of 15/9.
12. $1\frac{1}{2}$ of $1\frac{1}{3}$ of $1\frac{1}{4}$ of $1\frac{1}{5}$ of $1\frac{1}{6}$ of 3 lbs. 11 oz. 17 dwt.
13. 3 tons 6 cwt. 1 qr. 2 lbs. ÷ $2\frac{2}{3}$.
14. £4. 17. $6\frac{3}{4}\div\dfrac{4\frac{8}{9}}{12\frac{4}{7}}$.

15. $\dfrac{3\frac{7}{11}}{4\frac{2}{7}}$ of $\dfrac{10\frac{5}{7}}{7\frac{1}{2}} \times \dfrac{77}{540}$ of £2. 14.
16. $\dfrac{\frac{2}{3} \times \frac{3}{4} + \frac{1}{2} \div 2\frac{1}{2}}{(\frac{3}{4} - \frac{1}{3}) \div (\frac{1}{2} + \frac{1}{3} \text{ of } 6)}$ of £6. 18. $11\frac{1}{2}$.
17. £97. 1. $2\frac{1}{4} \times 6\frac{6}{7}$.
18. $(4\frac{13}{14} + 5\frac{5}{21})$ of $(6\frac{3}{4} - 3\frac{6}{7})$ of 3 tons 15 cwt. 3 qrs.
19. 37 tons 13 cwt. 1 qr. 7 lbs. $\div 1\frac{7}{9}$.
20. 42 tons 11 cwt. 25 lbs. $\times 2\frac{3}{11}$.
21. £394. 15. 3 $\div 3\frac{3}{11}$.
22. £238673. 13. $5\frac{1}{4} \times \frac{80}{81}$.
23. $\dfrac{\frac{3}{16} \text{ of } 21/. - \frac{2}{15} \text{ of } 20/.}{9/. - 7\frac{1}{2} \text{ of } \frac{2}{3} \text{ of a farthing}}$.
24. $\dfrac{1\frac{1}{2}}{2\frac{1}{3}}$ of $6/8\frac{1}{2} + 2\frac{1}{3}$ of $1\frac{1}{8}$ of £6. 8. 6 $- \frac{31}{32}$ of 12/.
25. $\dfrac{\dfrac{\frac{25}{32}}{1\frac{3}{4} - \frac{1}{12}} \text{ of } 1\frac{5}{19} \text{ of £}5 - \frac{23}{57} \text{ of £}3.\ 3}{\text{£}1.\ 14.\ 8\frac{14}{19}}$ of 12/4.

XIII. Reduction of Fractions:

1. Reduce $11/8\frac{1}{4}$ to the Fraction of $19/5\frac{3}{4}$.
2. Reduce £20. 14. $6\frac{3}{4}$ to the Fraction of £24. 9. $11\frac{1}{4}$.
3. Reduce £33569. 11. $11\frac{3}{4}$ to the Fraction of £3159. 9. 10.
4. Reduce 46 tons 9 cwt. 1 qr. to the Fraction of 51 tons 12 cwt. 2 qrs.
5. Reduce 2 lbs. 13 dwt. 12 grs. to the Fraction of 3 lbs. 9 oz. 16 dwt. 12 grs.
6. Reduce 2 tons 17 cwt. 2 qrs. 19 lbs. 6 oz. to the Fraction of 4 tons 2 qrs. 27 lbs. 2 oz.
7. Reduce 2 m. 7 fur. 30 po. 1 yd. 2 ft. to the Fraction of 3 m. 7 fur. 26 po. 5 yds. 2 ft. 8 in.
8. Reduce 105 ac. 2 r. 5 p. to the Fraction of 115 ac. 20 p.
9. Reduce £105. 1. 3. to the Fraction of £371. 4. 5.
10. Reduce 1 cwt. 1 qr. 15 lbs. 13 oz. to the Fraction of 18 cwt. 2 qrs. 5 lbs. 8 oz.

11. Reduce $\frac{2}{9}$ of $\frac{5}{13}$ of 19s. 6d. to the Fraction of $\frac{3}{5}$ of $\frac{4}{17}$ of £1. 8. 4.
12. What fraction of 3 hrs. 35 min. is $\frac{2}{7}$ of $\frac{3}{4}$ of 20 hrs. 4 min.
13. Reduce $\frac{1}{3}$ of 3s. $4\frac{1}{2}$d. to the Fraction of $\frac{1}{3}$ of $\frac{1}{11}$ of £11. 2. 9.
14. Reduce $\frac{2}{3}$ of a fathom to the Fraction of $\frac{7}{11}$ of a pole.
15. Reduce $\frac{2}{3}$ of $\frac{1}{5}$ of 16s. 3d. to the Fraction of $\frac{1}{7}$ of $\frac{2}{9}$ of 3 guineas.
16. Reduce the difference between $\frac{4}{5}$ of 1 hr. and $\frac{1}{25}$ of 1 day to the Fraction of their sum.
17. What fraction of $\frac{2}{3}$ of 10s. 6d. is $\frac{1}{2}$ of $\frac{3}{7}$ of 6s. 5d.
18. Reduce $\frac{3}{11}$ of 4/6 to the Fraction of 8/3 and find what fraction of $2\frac{1}{2}$ hrs. $\frac{1}{5}$ of 3 minutes is.
19. Reduce $\frac{1}{3}$ of 5s. $2\frac{1}{4}$d. to the Fraction of $\frac{3}{5}$ of $\frac{3}{7}$ of £9. 1. $6\frac{3}{4}$.

VIII.

MISCELLANEOUS EXAMPLES IN FRACTIONS.

1. Add together $8\frac{1}{7}$, $\frac{9}{14}$, $4\frac{5}{21}$, $2\frac{17}{42}$, subtract $3\frac{4}{45}$ from $8\frac{1}{30}$, multiply $9\frac{5}{11}$ by $4\frac{1}{3}$ and divide $72\frac{1}{2}$ by $7\frac{1}{4}$.
2. Find the value of
$$37 - \left(\tfrac{3}{4} + \tfrac{5}{6} + \tfrac{1}{2}\right) - \left(\tfrac{1}{4} - \tfrac{1}{6} + 1\tfrac{1}{2}\right).$$
3. $$\frac{3\frac{2}{3}}{2\frac{3}{5}} \text{ of } \frac{1\frac{6}{7}}{1\frac{4}{7}} \text{ of } \frac{3}{4} \text{ of } \frac{1}{7} - \frac{5}{7} \text{ of } \frac{3}{4} \times \frac{1 - \cfrac{1}{2 + \frac{3}{16}}}{3\frac{2}{7}} \text{ of } \frac{4\frac{3}{5}}{3\frac{4}{5}}.$$
4. What number added to $9\frac{1}{2}$ will give $12\frac{5}{6}$, and from what must $\frac{5}{18}$ be subtracted to leave $\frac{1}{2}$?
5. The Captain and his two mates have respectively $\frac{1}{8}$, $\frac{1}{9}$, $\frac{1}{10}$ of the cargo allotted to them, the remainder belongs to 121 shareholders. If each share produced £119. 10., what was the value of the cargo, what did the Captain &c. receive?
6. A man paid away $\frac{1}{3}$ of a legacy, then $\frac{1}{4}$ of the re-

mainder and finally $\frac{1}{6}$ of his first payment. After these three payments he had £90. 6. 2. left. Find the value of the original legacy.

7. Find the value of $\frac{11}{17}$ of a legacy, if $\frac{9}{17}$ of it amount to £3473. 17. 9.

8. By what fraction must
$$\left\{\frac{3\frac{8}{9} + 7\frac{10}{11} + \frac{4}{5}}{3\frac{8}{9} \times 7\frac{10}{11} \text{ of } \frac{4}{5}} + 3\frac{2}{29}\right\} \div 9\frac{2}{5}$$ be multiplied that the result may equal 4?

9. Find the greatest and least of the following fractions:
$$\frac{78}{89},\ \frac{65}{76},\ \frac{78+65}{89+76},\ \frac{78\times65}{89\times76}.$$

10. Increase, multiply and divide by $1\frac{5}{6}$ the expression
$$\left(4\frac{4}{9} + \frac{5}{11} \text{ of } \frac{1}{10}\right) \times 2\frac{1}{7} \div \left\{9\left(1+\frac{1}{13}\right) + \left(1-\frac{1}{13}\right) \div 12\right\}.$$

11. What fraction must be added to $2\frac{1}{3} + \dfrac{3\frac{1}{3} - \frac{1}{6}}{3\frac{1}{3} + \frac{1}{6}} - 2\frac{5}{7}$ of $\frac{4}{19}$ that the sum may be equal to 3.

12. Simplify $\left(3\frac{5}{7} + 2\frac{4}{11}\right) \times \left(1\frac{1}{15} + 1 - \frac{1}{9}\right)$ of $\frac{1}{26}$.

13. *A*, *B* and *C* were left £169000, in the proportion of $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, but *B* died before the testator, and his share was equally divided between *A* and *C*. What did they each receive?

14. After the value of a business had been increased by $\frac{5}{6}$, $\frac{7}{36}$ of it were sold for £164368.1s., find its original value.

15. From what fraction must $\frac{11}{75}$ be subtracted that the result added to $3\frac{3}{5} + 4\frac{2}{5}$ of $\dfrac{5\frac{1}{6}}{7\frac{1}{8}-6\frac{1}{7}} - \dfrac{9}{10\frac{10}{11}} \div \dfrac{3}{4}$ may equal 26.

16. Of what sum of money is £22. 8. $4\frac{1}{2}$. the three-elevenths?

17. Divide $1\frac{13}{14} + 1\frac{14}{15} + \frac{15}{16}$ by 42, multiply the quotient by the product of the sum and difference of $\frac{7}{8}$ and $\frac{6}{7}$, and add $4\frac{2}{3}$ of $\dfrac{1}{1\frac{2}{97}}$ of $\frac{1}{16} + \frac{17}{45}$ to the result.

18. Reduce $\frac{9}{11}$ of $\frac{2\frac{1}{2}}{3\frac{1}{2}} \div \frac{4\frac{1}{4}}{5\frac{1}{5}}$ of £15. 4. $2\frac{3}{4}$ to the fraction of $\left(\frac{9}{11} + \frac{2\frac{1}{2}}{3\frac{1}{3}} - \frac{4\frac{1}{4}}{5\frac{1}{5}}\right)$ of £6. 6. 9.

19. Multiply $\frac{1}{246} + \frac{1}{258}$ by $5^3 + 1 - \frac{1}{5\times3-1}$.

20. A merchant after trading for 6 years died worth £73426. 10s., the first year he had increased his original capital by $\frac{1}{6}$, the second by $\frac{1}{5}$, the third by $\frac{1}{4}$, the next two years by $\frac{1}{3}$ and $\frac{1}{2}$, and the last year he had doubled his original capital. Find the increase of capital each year.

21. Express $\Big\{ 11\frac{6}{7} + \frac{4\frac{1}{6}}{3}$ of $5\frac{2}{7} - 5\frac{1}{7} \div \frac{3}{5}$ of $\frac{\frac{1}{17} - \frac{1}{18}}{\frac{1}{17} + \frac{1}{18}}$ of $16 - \frac{1}{2} \div \frac{\frac{1}{31} + \frac{1}{32}}{\frac{1}{31} - \frac{1}{32}} \Big\}$ of £99. 19. $11\frac{3}{4}$ as a fraction of $\left\{\frac{1}{3} + \frac{1}{4} - \frac{1}{7}\right\}$ of £299. 19. $11\frac{1}{4}$.

22. What multiple of $1\frac{4}{11}$ of $1\frac{4}{5}$ of $\frac{1}{17}$ of 3 cwt. 2 qrs. 4 lbs. is $\frac{1}{11}$ of $2\frac{2}{17}$ of $\frac{4\frac{1}{4} + 4\frac{1}{4} \div 2 + \frac{5\frac{1}{2} - 2\frac{1}{2}}{5\frac{1}{2} + 2\frac{1}{2}}}{4\frac{1}{4}}$ of 3 cwt. 1 qr. 10 lbs.?

23. Find the value of
$(1\frac{7}{15} + 2\frac{1}{2})\ (9\frac{1}{2} - 7\frac{4}{7})\ (\frac{2}{3} - \frac{7}{15} - \frac{2}{45} + \frac{2}{5})$.

24. Divide 300 guineas among 92 men giving the first $\frac{1}{7}$ of the whole, the second $\frac{1}{10}$ of the remainder and the rest equal shares.

25. Reduce $\frac{4}{5}$ of $\frac{3}{7}$ of $7\frac{1}{2}$d. to the fraction of half-a-guinea. Divide $\frac{1}{4}$ of $1\frac{3}{5}$ by $\frac{3}{5}$ of $\frac{4}{9}$, and 16 ft. 4 in. by $2\frac{1}{10}$.

26. Three men can do a piece of work in 21 days; but after they have worked 5 days a certain number of additional workmen are put on, and the work is finished in 4 days. How many additional workmen were employed?

27. How many hours a-day must 253 workmen work in order to do in 133 days a piece of work which 161 workmen can do in 190 days of 11 hours each?

IX.

DECIMALS.

I. Find the value of:

1. 5·34 + ·635 + 709 + 75·6 + ·00847 + 49·031.
2. 126·18 + ·221399 + 4·199504 + ·0005772 + 6·0234.
3. 8·2387 + ·890932 + 5·123736 + ·003431 + 477.
4. 907·52116 + ·123 + 2·85294 + ·322372 + ·0608.
5. 9·885301 + 18·26169 + 822 + 0·04843 + ·3576.
6. 591·43 + ·196 + ·000203 + 206 + 2·86 + 49·658365.
7. 7·75791 + ·0887915 + 989·62092 + ·9112085 + 2·24209.
8. 4235·47 + ·000459 + 473 + 8·6191797 + 681·112543 + ·01.
9. 74·782372 + 700·71 + ·5947101 + ·976985 + 7·401927 + ·107.
10. 34·344845 + ·0764 + 7·91 + 4 + 8·004163 + ·427143 + ·001.
11. $\frac{5}{10} + \frac{37}{100} + \frac{1}{1000} + \frac{119}{1000} + \frac{8476}{10000} + \frac{375}{10}$.
12. 813 + 420·91 + ·00093 + 7·043 + 12560 + 500·9.
13. 50004 + ·46 + ·579 + 1201·043 + ·125.
14. ·2764 + 1824 + 176·09032 + ·47 + ·0037.
15. 802·573 + 31·095 + 9·7235 + ·507 + 903.
16. ·024 + 1000 + ·005625 + 2·432 + 60·211 + ·000125.

$$\left.\begin{array}{l} 17.\ \frac{2}{10} + \frac{8}{100} + \frac{32}{1000} + \text{\&c.} \\ 18.\ \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}\ \text{\&c.} \\ 19.\ \frac{3}{5} + \frac{3}{25} + \frac{3}{125} + \frac{3}{625} + \text{\&c.} \end{array}\right\}\ \text{to five places of decimals.}$$

II. Find the value of:

1. 2·1379 — ·9731, 98·47 — 1·984, 1 — ·1.
2. ·01 — ·001, ·00426 — ·000426, 37·168 — 29·837.
3. 2 — ·00001, 16·9134 — 9, 173—39·1867.
4. 8·163 — ·918437816, 1864 — ·139547.
5. 1·010101 — ·9090909, ·476009 — ·3984758.
6. 2·21 + ·395 — 69·4 + 764, 1·01 — ·101.
7. 112·15187 + 231·0186 — 7·134816 — ·5063.
8. 82·28418 — ·8669001 — 88·8709 + 79·912.
9. 2·002002 — 11·60380053 + 119·023631.
10. 1260·06 — ·00001 + 536·508233 — 1000·351.
11. $\frac{59}{100} - \frac{9}{1000}$, $16\frac{37}{100} - \frac{9367}{1000}$, $\frac{1}{100} - \frac{9}{1000}$.

III. Find the value of:

1. 47·1 × ·611, ·723 × 80·2, ·5135 × ·0032, ·384 × 1000 and ·0001.
2. ·000911 × ·289, ·011081 × 104, ·003 × ·36, ·0001 × 100.
3. 150·3304 × ·099436, ·00011 × ·0024, 160·3 × ·74.
4. ·00758 × ·804, 88·9907 × 1603·7, 95 × ·000121.
5. 5820·713 × ·000794, 8·651 × ·82034, ·001 × 70.
6. ·1 × ·1 × ·1 × ·1 × ·1 × ·1, ·1 × ·2 × ·3 × ·4 × ·5 × ·6 × ·10.
7. ·11 × ·0001 × ·834 × 12000 × 23·64, $13\frac{3}{100} \times 11\frac{4}{1000}$.

IV. Find the value of:

1. 37·5 ÷ 5, ·5, 16, 30, ·00125, 1·92; 5 ÷ ·5; 1 ÷ ·01.
2. ·0196 ÷ 350, 2·45, ·112, ·006272; 7·49 ÷ 1000, ·0001.
3. 7·371 ÷ 202·5, ·002268, 113750, ·056; ·01 ÷ 1000, ·001.
4. 27750 ÷ ·0768, 462·5; 554·07 ÷ ·219, 1150, 4·125.
5. ·1 by ·00125 and 1600; 9·17 by ·001792 and 40·9375.
6. 209·53 by ·00071875, 373·1456; ·001 ÷ ·01, 100, ·005.

V. Reduce to vulgar fractions in their lowest terms:

1. ·94, ·25, ·625, ·170, 1·7.
2. 4·125, ·144, ·78125, 25·5.
3. 5·5, ·1600, ·0016, 12·5.
4. 97656·25, 97·65625, ·09765625.
5. ·00064, ·064, 6·4, 0·064.

VI. Reduce to Decimals:

1. $\frac{3}{4}$, $\frac{4}{5}$, $\frac{5}{80}$, $\frac{17}{16}$, $\frac{23}{25}$, $\frac{111}{125000}$.
2. $\frac{13}{100}$, $\frac{119}{256}$, $4\frac{37}{125}$, $19\frac{35}{64}$.
3. $\frac{191}{25}$, $\frac{47}{10}$, $\frac{2}{3}$, $\frac{13}{192}$, $\frac{27}{1000}$.
4. $\frac{139}{20}$, $\frac{1864}{128}$, $41\frac{17}{45}$, $\frac{5}{24}$, $\frac{2}{7}$.
5. $\frac{14}{11}$, $\frac{11}{27}$, $\frac{4}{7}$, $\frac{6}{7}$, $9\frac{11}{13}$, $\frac{8}{7}$.
6. $\frac{7}{19}$, $\frac{234}{265}$, $\frac{357}{3000}$, $\frac{5}{99}$.
7. $\frac{8}{23}$, $\frac{91}{175}$, $\frac{9}{29}$, $\frac{17}{999}$, $\frac{17}{333}$.
8. $\frac{23}{77}$, $\frac{521}{777}$, $\frac{11}{39}$, $\frac{37}{990}$, $\frac{56783}{124875}$, $\frac{15}{19}$, $\frac{42857}{142857}$.

VII. Reduce to vulgar fractions in their lowest terms:

1. ${\cdot}\dot{3}$, ${\cdot}\dot{8}$, $\dot{2}\dot{7}$, ${\cdot}\dot{2}9\dot{7}$, ${\cdot}\dot{3}\dot{3}$.
2. ${\cdot}\dot{0}\dot{3}$, ${\cdot}\dot{0}0\dot{3}$, ${\cdot}\dot{0}00\dot{3}$, ${\cdot}\dot{3}0\dot{0}$.
3. $4{\cdot}\dot{7}2\dot{9}$, $37{\cdot}\dot{4}\dot{5}$, $5{\cdot}\dot{7}1428\dot{5}$, ${\cdot}3\dot{8}$.
4. $2{\cdot}\dot{8}5714\dot{2}$, $5{\cdot}4\dot{3}$, ${\cdot}\dot{1}0\dot{1}$, ${\cdot}10\dot{1}$.
5. ${\cdot}0024\dot{1}\dot{2}$, ${\cdot}24318\dot{3}$, $16{\cdot}428\dot{4}2857\dot{1}$.
6. $53{\cdot}3\dot{9}$, $2{\cdot}9\dot{1}\dot{9}$, ${\cdot}015\dot{1}2\dot{0}$, ${\cdot}11\dot{3}\dot{6}$.

VIII. Find the value of:

1. $716.4\dot{3} + 85{\cdot}\dot{4} + 1{\cdot}00\dot{6} + 36{\cdot}24 + 5{\cdot}7\dot{3}$.
2. $16{\cdot}4\dot{3} + 1{\cdot}7\dot{8}\dot{9} + 164{\cdot}3 + 17{\cdot}08\dot{9} + 1{\cdot}10\dot{1}$.
3. $80{\cdot}1\dot{2} + 375{\cdot}0\dot{1}\dot{3} + 1{\cdot}06\dot{4} + {\cdot}80\dot{0}\dot{2} + 35{\cdot}161$.
4. $14{\cdot}4\dot{3}\dot{5} + 1{\cdot}4\dot{0}4\dot{5} + 3{\cdot}\dot{6} + {\cdot}4\dot{0}7\dot{1}$.
5. $30{\cdot}\dot{0}4\dot{1} + 17{\cdot}0\dot{0}\dot{4} + 5{\cdot}00\dot{0}\dot{4} + 8{\cdot}70\dot{0}\dot{1}$.
6. $1{\cdot}167\dot{4} + {\cdot}34\dot{7}\dot{1} + 2{\cdot}\dot{0}0\dot{1} + 1{\cdot}172\dot{0}7052\dot{5}$.
7. ${\cdot}01\dot{4}\dot{3} + {\cdot}08\dot{3}8899\dot{4} + 1{\cdot}0\dot{1}4\dot{3} + 18{\cdot}01\dot{0}\dot{9}$.
8. $4{\cdot}\dot{3}5\dot{7} + 1{\cdot}84\dot{5}1708954679\dot{2} + 1{\cdot}13\dot{0}\dot{5} + {\cdot}\dot{0}00\dot{3}$.
9. ${\cdot}253\dot{5}7\dot{8} + 1{\cdot}24\dot{0}1082\dot{9} + {\cdot}003\dot{5}\dot{8} + 4{\cdot}50\dot{2}\dot{7}$.

10. $270\cdot\dot{0}1\dot{0} + 27\cdot\dot{0}01\dot{0} + 2\cdot700\dot{1}\dot{0} + \cdot27001.$
11. $3\cdot0\dot{0}\dot{9} + 19\cdot\dot{0}9\dot{0} + \cdot89\dot{1}9000008108\dot{9} + 7\cdot\dot{0}09\dot{0}.$
12. $1\cdot382\dot{0}1274\dot{0} + 35\cdot7\dot{9}\dot{1} + 2\cdot4\dot{6}8\dot{0} + \cdot135\dot{7}.$
13. $25\cdot\dot{1}4285\dot{7} + 46\cdot\dot{1}3\dot{6} + 7\cdot86\dot{3} + 5\cdot85\dot{7}1428\dot{5}$ $+ 12\cdot\dot{8}6\dot{3}.$
14. $\cdot29\dot{3}\dot{4} + 7\cdot01\dot{3} + 6\cdot\dot{1}3\dot{5} + 101\cdot\dot{1}01\dot{1} + 45\cdot21\dot{4}.$
15. $1\cdot31\dot{2}\dot{4} + 31\cdot7984\dot{5} + \cdot\dot{3}7\dot{9} + 2\cdot\dot{8} + 1\cdot2\dot{1}8\dot{3}.$
16. $6\cdot2\dot{7}\dot{3} + 13\cdot0\dot{1} + 68\cdot27\dot{3} + 2\cdot7914 + 8\cdot\dot{5}\dot{1}.$
17. $89\cdot\dot{8}\dot{9} + 8\cdot\dot{9}8\dot{9} + \dot{8} + 9 + 30\cdot\dot{1}8\dot{0} + \cdot\dot{7}.$
18. $\frac{7}{9} + \frac{9}{11} + \frac{10}{37} + \frac{100}{101}.$
19. $\frac{5}{9}+\frac{5}{99}+\frac{5}{999}+\frac{5}{9999}+$ &c. to seven places of decimals.
20. $\frac{2}{3}+\frac{2}{33}+\frac{2}{333}+\frac{2}{3333}+$ &c. to seven places of decimals.

IX. Find the value of:

1. $37\cdot46\dot{3} - 19\cdot54\dot{8},\ 15\cdot13\dot{5} - 11\cdot1\dot{5},\ 34\cdot1\dot{4} - \cdot047\dot{6}.$
2. $197\cdot36\dot{7} - 19\cdot736\dot{8},\ 75\cdot\dot{0}\dot{3} - 17\cdot\dot{3}\dot{6}.$
3. $1\cdot39 - \cdot984\dot{7},\ 41\cdot973\dot{6} - 7\cdot637819.$
4. $213\cdot5\dot{6}\dot{7} - 187\cdot\dot{4}\dot{9},\ 39\cdot8\dot{1}\dot{6} - 27\cdot983\dot{4}.$
5. $9\cdot2\dot{3}7\dot{1} - 7\cdot7\dot{1}6\dot{4},\ 87\cdot31\dot{5}6\dot{4} - 78\cdot\dot{8}\dot{7}.$
6. $37\cdot8\dot{1}3\dot{4} - \cdot49\dot{8}5137\dot{6},\ 111\cdot\dot{1}3475\dot{6} - 39\cdot03\dot{4}\dot{0}.$
7. $16\cdot\dot{5}7142\dot{8} - 9\cdot3\dot{8}5714\dot{2},\ 197\cdot3\dot{4}\dot{7} - \cdot210\dot{1}4285\dot{7}.$
8. $97\cdot\dot{5}1274\dot{8} - 89\cdot36\dot{5}4872\dot{1},\ 31\cdot\dot{0}101\dot{1} - \cdot8\dot{7}.$
9. $171\cdot0\dot{3}41\dot{9} - 83\cdot0\dot{9}1\dot{4},\ 134\cdot1\dot{3}579\dot{0} - 68\cdot3\dot{4}\dot{7}.$

X. Find the value of:

1. $13\cdot45\dot{6} \times 3,\ 7,\ 37,\ 49\cdot49;\ 4\cdot1\dot{3}5\dot{7} \times 300,\ 1\cdot7,\ 1\cdot11.$
2. $7\cdot\dot{4}1\dot{7} \times 4,\ 5,\ 45,\ 54,\ 7\cdot3;\ 4\cdot5\dot{6} \times 18,\ 125,\ \cdot00\dot{3}.$
3. $279\cdot689 \times \cdot\dot{4},\ 3\cdot0\dot{5},\ \cdot001\dot{7},\ 36\cdot\dot{4}\dot{8}.$
4. $6\cdot8\dot{4}5\dot{1} \times \cdot011,\ 6\cdot25,\ \cdot\dot{7}.$
5. $\cdot014\dot{1}5\dot{7} \times \cdot0\dot{3}\dot{6},\ 5\cdot\dot{1}4285\dot{7},\ \cdot0125,\ 7\cdot209.$
6. $14\cdot3\dot{4}9\dot{8} \times \cdot06,\ \cdot025,\ \cdot0\dot{2}\dot{1},\ 1\cdot1\dot{3}\dot{6}.$
7. $\cdot001\dot{3}76\dot{2} \times \cdot0011,\ 3\cdot3\dot{2}\dot{7}.$
8. $\cdot02\dot{2}97\dot{9} \times 125\cdot1\dot{1}2\dot{6},\ \cdot019998.$
9. $\cdot\dot{1}2345679\dot{0} \times 9,\ 1\cdot51146,\ \cdot7\dot{9}1000000\dot{8}.$

XI. Find the value of:

1. $\cdot342\dot{5} \div 3,\ 5,\ \cdot07,\ 1\cdot1,\ 4\cdot4,\ \cdot13.$
2. $\cdot001\dot{3}\dot{7} \div 4,\ 10,\ 15,\ 2\cdot1,\ 136,\ 137.$
3. $\cdot1\dot{0}0\dot{1} \div 2,\ 9,\ 11,\ 7,\ 100\cdot1,\ \cdot00\dot{5}.$
4. $36\cdot\dot{7}45\dot{8} \div \cdot0004,\ \cdot03,\ \cdot\dot{2},\ \cdot0\dot{3},\ 4\cdot\dot{5}\dot{4}.$
5. $21\cdot\dot{6}85714\dot{2} \div \cdot5,\ 1\cdot1,\ \cdot015,\ \cdot000\dot{3},\ 10\cdot\dot{3}71428\dot{5}.$
6. $19\cdot0\dot{3}4\dot{7} \div \cdot05,\ \cdot0003,\ 1\cdot\dot{3},\ 2\cdot\dot{7},\ 1\cdot21\dot{1}3\dot{0}.$
7. $3\cdot5\dot{3}7\dot{0} \div 15\cdot\dot{4}\dot{3};\ 1\cdot2\dot{8}6195\dot{2} \div 3\cdot\dot{1}2\dot{8}.$
8. $\cdot2277 \div 1\cdot\dot{1}\dot{6},\ 13\cdot\dot{7}6\dot{3},\ 3\cdot\dot{2}8571\dot{4}.$
9. $1\cdot\dot{0}\dot{1} \div 9,\ \cdot\dot{6}2\dot{5},\ \cdot\dot{0}\dot{9};\ \cdot\dot{0}\dot{9} \div \cdot\dot{9}0\dot{9}.$

XII. Find the value of:

1. The difference between one thousandth and ten millionths.
2. 8 ÷ three ten millionths, $\cdot07 \div 35$, $\cdot000007 \div 3\cdot5$.
3. $\dfrac{1}{\cdot00125} \times \dfrac{1}{64} - \dfrac{\cdot000225}{\cdot4 \times \cdot001 + \cdot004 \times \cdot0125}.$
4. $(\cdot1\dot{8} \div \cdot234) \times (\cdot026 \div 1\cdot\dot{8}),$
   $\cdot\dot{1}5\dot{6} + \cdot1\dot{5}\dot{6} + \cdot15\dot{6} + \cdot156.$
5. $\dfrac{(3\cdot2\dot{1})^2 - 1\cdot52\dot{1}}{1\cdot9\dot{7}},\ 1\cdot010101 - \cdot1010101.$
6. $\dfrac{6\cdot25 - 2\frac{1}{4}}{2\frac{1}{2} - 1\cdot5}$, 14 hundredths — 9 thousandths.
7. 4 tenths + 125 thousandths + 80 + 17 hundredths + 1983 ten millionths.
8. $\dfrac{1\cdot52\dot{1} - (\cdot7\dot{6})^2}{\cdot4\dot{6}},\ 3 - (\cdot013 + 1\cdot3 - \cdot13).$
9. $\cdot64176 \times 1\cdot1 \div \cdot012,\ \dfrac{(2\cdot5)^2 - 2\cdot25}{2\cdot5 + 1\cdot5}.$
10. $\dfrac{(4\cdot3)^2 - (3\cdot4)^2}{\cdot43 - \cdot34},\ \dfrac{9\cdot5 + 5\cdot9}{\cdot95 + \cdot59},\ 240\cdot5 \times 13\cdot75 \div 6512.$
11. $\dfrac{5\cdot4 + 4\cdot5}{\cdot54 - \cdot45},\ \cdot00792 \times 70\cdot784 \div 5\cdot43125.$
12. $\left\{ 2376\cdot55 + \frac{1}{\cdot04} \text{ of } 101\cdot67 \right\} \div \cdot0100147 \times \left\{ 987650 - 73900 \right\} \times \cdot0000001.$

XIII. Find the value of:

1. ·375 of £1, $\cdot 8\dot{3}$ of 7/6, ·245 of £2 1s. 8d.
2. $\cdot 1\dot{7}85714\dot{2}$ of £80. 3s. 7d., ·44 of £42. 12s. 7¼d.
3. ·5625 of £37. 15s., ·0272 of £7. 3s. 2¾d.
4. 5.0625 of £137. 10s., ·375 of 2 guineas + $\cdot\dot{1}\dot{8}$ of £1. 4s. 9d.
5. ·6 of ·625 of 17/6 + ·84 of 12/2¼; ·14 of £1. 5s. + 3·6825 of 1/4 + ·36 of 1/3.
6. 2·8125 of £3. 1s. + ·1008 of 13/10¼ + $\cdot 013\dot{6}$ of 3s.
7. $3\frac{1}{7}$ of $\cdot\dot{2}\dot{8}$ of ·75 of £5. 17s. 9d. + $3\cdot\dot{1}4285\dot{7}$ of $\cdot\dot{3}$ $\cdot\dot{6}\dot{3}$ of £6. 2s. 3d.
8. 2·25 of £3. 11s. + $3\cdot\dot{3}$ of 2·625 of £5. 16s. — $1\cdot 291\dot{6}$ of 13/6 — $\cdot 08\dot{3}$ of 5/3.
9. $2\cdot\dot{1}4285\dot{7}$ of 5/1¼ + $3\cdot\dot{3}$ of $5\cdot 0\dot{7}1428\dot{5}$ of 7/10½ — $4\cdot\dot{2}3809\dot{5}$ of 4/9¾.
10. $\frac{1\cdot 5}{2\cdot\dot{3}}$ of 15/5½ + $2\cdot\dot{3}$ of 1·125 of 6/6 — 4·75 of 1/1 + $2\cdot\dot{3}$ of 5/·.
11. $(2\cdot\dot{5} + 3\cdot\dot{4})$ of 1/1¼ + $(2\cdot 5 - \frac{3}{1\cdot\dot{3}})$ of 1/10 — $\frac{3\cdot 5}{4\cdot\dot{3}}$ of 5/11½.
12. 1·5 of 2½d. + $\frac{3\cdot 5 - \cdot 25}{3\cdot 5 + \cdot 25}$ of £3. 15s. — 2·6 of $\cdot\dot{0}7692\dot{3}$ of 2/2¼ — $\cdot\dot{8}5714\dot{2}$ of 3/7¾.
13. $2\cdot 9\dot{2}8571\dot{4}$ of 3/2½ — $3\,\frac{\cdot\dot{7}1428\dot{5}}{3}$ of 3/11¼ + $3\cdot\dot{8}5714\dot{2}$ of 10/6.
14. $\cdot\dot{1}4285\dot{7}$ of £36 — $\cdot\dot{3}$ of $\cdot\dot{4}2857\dot{1}$ of £18 + $\frac{4}{7}$ of ·4375 of £3 + $1\cdot 0\dot{9}$ of $\frac{3}{\cdot\dot{8}5714\dot{2}}$ of £1. 16s. 8d. + $\frac{\cdot\dot{5}7142\dot{8} + \cdot\dot{1}4285\dot{7}}{\cdot 0\dot{5}7142\dot{8} - \cdot 0\dot{1}4285\dot{7}}$ of $\cdot 01\dot{3} \times \cdot\dot{1}4285\dot{7}$ of £13. 10s.

XIV. Reduction of decimals.

1. Express as decimals of £1, £5, £·5: 16s. 4d., 10s. 3d., 18s. 5½d., 13s. 1½d., 19s. 7½d., 14s. 8¼d., 2s. 10¾d., 19s. 11¾d., £3. 8s. 6¼d., £11. 17s. 4¼d., £5. 11s. 1¼d., and £1. 1s. 1¼d.

2. Reduce £68. 10s. 7¾d. to the decimal of £205. 11s. 11¼d.
3. What decimal of £27. 18s. 11½d. is £5. 11s. 9½d.; and of £9. 13s. 2¼d. is 17s. 6¾d.?
4. Express 2s. 9¼d. as the decimal of 19s. 4¾d., and 13s. 8¼d. as the decimal of 18s. 3d.
5. What decimal of £38. 17s. 1d. and of £155. 8s. 4d. is £5. 1s. 0¼d.?
6. Express 2/7¾ and 5/4¾ as decimals of £10. 8s. 1½d.
7. Express $\frac{3}{40}$ of 4/5¼ as the decimal of $\frac{3}{5}$ of $\frac{1}{1\cdot\dot{3}}$ of 7/4¾.
8. Reduce $1\cdot7$ of $\left\{1\cdot\dot{2}\right.$ of £29. 5s. + $\cdot\dot{0}\dot{7}$ of £44. 4s. 9¾d.$\left.\right\}$ to the decimal of $\frac{5}{6}$ of £61. 5s. 1½d.
9. Express the difference between a sovereign and a farthing as a decimal of £1. 5s. 8¼d.
10. Express 5 oz. 16 dwt.; 8 oz. 17 dwt. 11 grs., as decimals of a lb. Troy.
11. What decimal of 154 lbs. 8 oz. 5 dwt. is 6 lbs. 5 oz. 19 dwt. 6 grs.
12. Reduce 1 oz. 15 dwt. 12 grs. to the decimal of 1 lb. 1 oz. 6 dwt. 6 grs.
13. Express 15 lbs. 8 oz.; 1 qr. 15 oz.; 10 cwt. 3 qrs. 17 lbs. 9 oz. as decimals of a ton.
14. Reduce 6 cwt. 1 lb. 7 oz. to the decimal of 7 cwt. 2 qrs. 19 lbs. 6 oz. and of 12 cwt. 2 qrs. 6 lbs. 4 oz.
15. Express 1 qr. 27 lbs. 11 oz. and 12 lbs. 6 oz. as decimals of 2 qrs. 12 lbs. 1 oz.
16. Express 19 po. 4 yds. 1 ft. 3 in.; 3 fur. 39 po. 5 yds. 1 ft. 6 in.; 7 miles 57 yds. 9 in. as decimals of a mile.
17. What decimal of 154 miles 1 fur. 13 po. 1 yd. 2 ft. 6 in. and 79 miles 7 fur. 15 po. 2 yds. 9 in. is 21 miles 38 po. 3 yds. 2 ft.?

18. Reduce 9 po. 1 yd. 2 in. and 23 po. 1 yd. 5·4 in. to the decimal of 20 po. 1 yd.

X.

MISCELLANEOUS EXAMPLES IN DECIMALS.

1. Divide 9·614 by ·0000019 and $\frac{2\frac{1}{5}}{5\frac{1}{2}}$ by $\cdot 00\dot{3}$, and multiply the sum of the quotients by ·0005.
2. Find the value of $9{\cdot}\dot{9}, 9{\cdot}\dot{0}90\dot{9}, 9{\cdot}0\dot{9}0\dot{9}, 9{\cdot}\dot{0}90\dot{9}, 9{\cdot}090\dot{9}$.
3. Find the value of $\cdot\dot{3} + \cdot 0\dot{4} + \cdot 21\dot{6} + \cdot 312\dot{5} + \cdot 093$.
4. Multiply £15. 17. 7¼ and divide £1985. 0. 6¼ by 125 by reduction to decimals.
5. Express $\frac{2^7}{7\times10^7} + \frac{2^3}{3\times10^3}$ as a decimal.
6. Shew that $\frac{1}{13000}$ of £5. 8. 4. = ·0001 of £4. 3. 4.
7. Find the value of $1{\cdot}\dot{8}\dot{9} - \cdot 1\dot{3}2\dot{4}$, $\cdot\dot{1}4285\dot{7} \times 7$, $7 - 6{\cdot}\dot{1}4285\dot{7}$ and $\cdot 1 + \cdot\dot{2} + \cdot\dot{3}\dot{4} + \cdot\dot{5}6\dot{7} + \dot{8}9\dot{0}$.
8. Reduce $\frac{9}{13}$ of £10. 6. 7¾ to the decimal of £·015.
9. A man walked in 4 days 60 miles; in each of the first three he walked $13{\cdot}9\dot{3}$ miles; how many did he walk the last day?
10. Divide 1·69 by ·13, 13, ·013, ·0000013, 1300.
11. Multiply $2{\cdot}\dot{3}$ and divide $13{\cdot}\dot{2}$ by $5{\cdot}\dot{6}$.
12. Divide 684·1197 by 1200·21 and by ·0120021.
13. If 1 lb. of sugar cost ·0703125 of 16/., find the value of ·0625 cwt.
14. Find the value of $\cdot\dot{1}0\dot{1}$ of 9/. + $\cdot\dot{0}4\dot{0}$ of 2/3 and find of what sum it equals $3{\cdot}\dot{4}2857\dot{1}$.
15. Reduce ·875 of 17/6 + $\cdot 1\dot{6}$ of £1. 8. 1½ to the decimal of £7.
16. Reduce 2 tons 3 qrs. 5 oz to the decimal of 2 tons.
17. Of what sum of money will ·325 = £13.
18. Express $\cdot 0\dot{0}2\dot{7}$, $\cdot 002\dot{7}$, ·12345 as sums of a series.

19. Find the value of $3\frac{4}{5} + 9\frac{5}{8} + 7\frac{3}{4} + 41\frac{111}{125} + 1\frac{2}{3}$ both by vulgar fractions and decimals, shew that the results coincide.
20. Reduce 11 cwt. 19 lbs. to the decimal of 10 tons 1 cwt. 6 lbs.
21. How many yards of paper $1{\cdot}41\dot{6}$ feet broad will be required for a room $13{\cdot}\dot{3}$ ft. high, 15·5 ft. long, $7{\cdot}1\dot{6}$ ft. broad?
22. Multiply 7 cwt. 3 qrs. 12 lbs. by 90·1 and by ·0125.
23. Reduce to a decimal, accurate to 5 places:

$$25\left\{\frac{1}{9\times2} - \frac{1}{9\times2^2} + \frac{1}{9\times2^3} - \frac{1}{9\times2^4} + \&c.\right\}.$$

24. Divide the difference between $7{\cdot}301\dot{3}$ and ${\cdot}7301\dot{3}$ by $7301{\cdot}\dot{3}$ and multiply the result by $3{\cdot}\dot{1}985239\dot{7}$.
25. Multiply 3 tons 17 cwt. 1 qr. 10·5 lbs. by ·005.
26. Reduce 7 fur. 32 p. 5 yds. to the decimal of 14 fur. 13 p. 3 yds. 2 ft.
27. Express as a decimal ·0003 + $\frac{817}{3125}$ — ·00847 + $\frac{361}{800}$.
28. Reduce to a decimal, accurate to 7 places:

$$1 + \frac{1}{1} + \frac{1}{1\times2} + \frac{1}{1\times2\times3} + \frac{1}{1\times2\times3\times4}\ \&c.$$

29. What decimal divided by ·56 will give the sum of the following fractions $4\frac{1}{3}$, $9\frac{3}{5}$, $\frac{38}{7}$, $\frac{23}{9}$, $7\frac{7}{11}$?
30. Calculate the rent of 38 ac. 2 r. 16 p. at £$17{\cdot}208\dot{3}$ the acre.
31. Reduce 7s. 4·27d. to the decimal of $\frac{8}{9}$ of 7 guineas and find the value of $5{\cdot}52353\dot{6}\dot{0}$ of a mile.
32. Divide $\frac{5}{9}$ — ·024 + $\frac{7}{18}$ — $\frac{11}{54}$ + $\frac{5}{8}$ by ${\cdot}009\dot{4}8\dot{1}$.
33. Multiply $2{\cdot}1\dot{6}$ of £3. 17 by $\frac{{\cdot}9\dot{3}}{1{\cdot}\dot{2}}$ of ${\cdot}41\dot{6}$.
34. Find the value of $\frac{1{\cdot}5}{2{\cdot}\dot{3}}$ of 7/8$\frac{3}{4}$ + $2{\cdot}\dot{3}$ of 1·125 of 6/6 — 4·75 of 6$\frac{1}{2}$d. + $2{\cdot}\dot{3}$ of 5/.
35. What will it cost to paint the outside of a cubical box whose edge is 4·5 ft. at $1{\cdot}1\dot{6}$ shillings per sq. yd.?

36. Express $\frac{2^5}{10^5} + \frac{2^4}{2^3 \times 5^4}$ in decimals.

37. Find the value in English money of 900·28125 Francs when the exchange is 24·25 Fr. per £.

38. A dealer in oil bought 1 tun 3 hhds. 12 gals. of oil for £92. 16. 10; 24·5 gallons leaked out; at what price per gallon must he sell the remainder, that he may be no loser?

39. Add together $(\frac{1}{2} + \frac{3}{4})$ ton, $(\frac{2}{3} + \frac{3}{4})$ cwt., $(\frac{3}{4} + \frac{4}{5})$ qr. and reduce the result to the decimal of a ton.

40. Find the value of 1·5 of $2\frac{1}{2}$d. + 2·6 of $\cdot\dot{0}7692\dot{3}$ of $2/2\frac{1}{4}$ + $\frac{3\cdot5-\cdot25}{3\cdot5+\cdot25}$ of £3. 15. + $\cdot\dot{8}5714\dot{2}$ of $3/7\frac{3}{4}$.

41. In a competitive Examination, ·07 of the candidates fail to qualify, $\frac{12}{31}$ of the remainder are unsuccessful and 114 are elected. How many candidates at first presented themselves?

42. Find the value of ·175 tons + ·195 cwt. + ·145 qr. + ·6 lbs.

43. Multiply £16. 17. 10. by ·625 and reduce the result to the decimal of £12.

44. Find the value of $(2\cdot\dot{5} + 3\cdot\dot{4})$ of $1/1\frac{1}{4}$ + $\frac{3}{1\cdot\dot{3}-\cdot25}$ of $1/10\frac{3}{4}$ + $\frac{3\cdot5}{4\cdot\dot{3}}$ of $5/11\frac{1}{2}$.

45. Express $\frac{17}{2^9 \times 5^8} + \frac{\cdot007}{2^9 \times 5^{11}}$ as a decimal.

46. Multiply $2/0\frac{1}{4}$ by 17·0625 and divide £10. 11. 3. by ·125.

47. One mètre = 3·280 Engl. ft. and one Fr. ft. = 1·066 Engl. ft. Express 1 French foot in mètres. The height of Mt. Blanc is 14760 French ft. Find its height in Engl. ft.

48. A cubic foot of water weighs 1000 oz and the weight of a given volume of air = the weight of the same volume of water × ·00125. What weight of air is contained in a room 36 ft. long 16 ft. broad and 7·5 ft. high?

49. Find the value of ·75 of a guinea + $\cdot 2\dot{1}4285\dot{7}$ of 13/4 — $\cdot\dot{2}8571\dot{4}$ of 13/6.

50. Express as decimals $\frac{276}{10^5} + \frac{923}{2^6 \times 5^7}$.

51. Express ·0025 by a simple fraction, and $\frac{3}{125} + 6\frac{3}{40} - \frac{17}{25}$ by a decimal. Multiply 1·25 by ·072. Divide ·010101 by ·02; 120 by ·0048; and 56·25 by 1·25.

52. Find the value of ·071875 tons; also of ·06 of £2. 10s.; and reduce 2 qrs. $5\frac{3}{5}$ lbs. to the decimal of 11 cwt.

53. Express 41937658 as a fraction with denominator 99999999 without any multiplication.

MISCELLANEOUS EXAMPLES.

1. Express in words 135790246 and MDCXCIX. Add one hundred and three millions fifty thousand seven hundred and nine, to twenty millions four hundred and six thousand and eighty.

2. Add together 4325637428, 5433262571 and 241100001, and subtract 4567849597 from the result.

In a railway train containing 270 passengers, 180 are in the first and third classes, and 225 in the second and third classes; how many passengers are there in each class?

3. Multiply 7467932 by 6957, and divide the result by 100000. Divide 3672364571 by 7193.

4. If a man make 1783 paces in walking a mile, how many will he make in a journey of 579 miles?

5. Find in their simplest forms the values of

$$2\tfrac{1}{2} - 1\tfrac{1}{4} + 6\tfrac{1}{2} + 3\tfrac{6}{7} + 5\tfrac{3}{4} - 8\tfrac{1}{2} - \tfrac{12}{7}.$$

$$\tfrac{6}{7} \times 14\tfrac{1}{7} \times \tfrac{2}{17} \times 5\tfrac{1}{3} \times \tfrac{3}{28} \div \tfrac{36}{49}.$$

$$\frac{4\frac{1}{3} - 3\frac{1}{3}\left\{2\frac{1}{4} - 1\frac{1}{7}\right\}}{3\frac{2}{7} - \frac{2}{3} \text{ of } \frac{6}{7} \div \frac{4}{5}}.$$

6. Multiply 1·5625 by ·32 and divide ·128 by ·04.

7. The length of a square room, whose height is 16 ft. 4 in. is 20 ft. 3 in. Find the area of one of its sides. Hence find how many yards of paper $1\frac{3}{4}$ ft. broad would be required to paper the whole room.
8. If 7000 cartridges are supplied to a squad of 84 men for 30 days, how many must be supplied to a squad of 60 men for 49 days?
9. In an examination, it was agreed that the maximum for Mathematics should be $\frac{3}{10}$ of the maximum for Classics. The Mathematical Examiner marked his papers on a maximum of 400. The Classical Examiner marked his on a maximum of 500; and sent his marks to his colleague requesting him to reduce the Mathematical marks to the proper standard, and add them in. *A*, *B*, and *C* had obtained respectively 260, 158, 127 for Classics, and 280, 72, 216 for Mathematics. What marks did they each ultimately receive?
10. Find the Greatest Common Measure of 17409 and 30673; and the Least Common Multiple of 12, 13, 40, 72, 78, 52, 56, 126 and 150.
11. Simplify $2\frac{4}{5} - \frac{1}{9}$ of $\dfrac{5\frac{1}{7} - 2\frac{1}{4}}{1 + \dfrac{1}{3 + \frac{1}{6}}}$ of $\dfrac{9\frac{1}{3}}{12\frac{1}{11}} \div 2\frac{1}{5}$.
12. Find the value of 3 tons 8 cwt. 3 qrs. 12 lbs. of tea at £24. 19s. 4d. per cwt. What is the price per lb.?
13. The carriage of a parcel of goods weighing 1 ton 8 cwt. 2 qrs. cost £2 14s., what will be the charge of 4 other parcels, each weighing 17 cwt. 3 qrs. 7 lbs.?
14. If the rent of a farm of 53 a. 1 r. 6 p. be £100 17s. 6d., what would be the rent of another containing 17 a. 3 r. 2 p., if 6 acres of the latter be worth 7 of the former?
15. A steam-vessel at full speed consumes 10 tons of coals on a voyage of 8 hours' duration; on the return

voyage the speed is reduced to three-quarters of full speed, and the consumption of coal is 10 cwt. less per hour than before. Find the total consumption of coal.

16. Reduce $5\frac{5}{1600}$ and $4\frac{7}{270}$ to decimals.
17. Divide 7·53 by 2500 and ·001440 by 1·92.
18. Add together $3{\cdot}\dot{0}2\dot{1}$ and $3{\cdot}0\dot{2}\dot{1}$ and reduce the result to a vulgar Fraction.
19. Express £3 2s. $4\frac{1}{4}$d. as a fraction of £3 9s. $2\frac{1}{4}$d.
20. Express $\dfrac{1}{\dfrac{1\frac{17}{24}-\frac{5}{6}}{1\frac{1}{3}\text{ of }1\frac{1}{7}}}$ of 2 cwt. 3 qrs. 7 lbs. — $2\frac{3}{16}$ of 2 qrs. 14 lbs. as a fraction of $4\frac{3}{8}$ of 21 lbs.
21. Find the value of £2·57 — 10·23s. + 3·46d.
22. Express ·37 of £1 17s. 6d. as a decimal of £18·75.
23. Find the rent of 113 acres 2 roods $13\frac{1}{3}$ perches at £2 5s. per acre.
24. Find the value of $\cdot 5625$ of £2 14s. + 22·0225 of 1s. $10\frac{1}{2}$d. — $\cdot 0602\dot{7}$ of 7s. 6d. + ·5225 of $7\frac{1}{2}$d.
25. Add together

Acres.	Roods.	Perches.	Yds.
15	2	32	26
14	0	10	$15\frac{1}{2}$
	1	26	10
	3	38	20

And subtract 4 acres 0 r. 30 p. 5 yds. from the result.

26. Multiply £42 6s. 4d. by 193.

Divide £473 17s. $6\frac{3}{4}$d. by 87, and add the two results together.

27. Four sheets of penny postage stamps are together worth £49 11s. 4d. How many stamps are in each sheet?
28. „Now a hundred and twenty staters are equivalent to three thousand three hundred and sixty drachmae, and the interest on this sum, viz., thirty-three minae and

sixty drachmae, is five hundred and sixty drachmae." — Dem. c. Phor. p. 914. How many drachmae are there in a mina and stater respectively? At what rate was the interest taken?

29. Find the value of

$$4\tfrac{1}{3} + 2\tfrac{1}{2} - 4\tfrac{3}{4} + \tfrac{1}{12} - 1\tfrac{2}{3}, \text{ and}$$

$$\frac{4\frac{1}{5} - 3\frac{1}{2}}{2\frac{1}{2} - 1\frac{1}{5}}.$$

30. At what rate per hour should a train move so as to travel over a railway 199 miles 586 yards 2 feet long, in 5 hrs. 6 min. 40 sec.?

31. Find the Greatest Common Measure and Least Common Multiple of 2295, 2565, 2925, and of 84, 198, 525, 495.

32. Find the value of 7936 articles at 2s. 11½d. each, and of 2 tons 16 cwt. 1 qr. 17¾ lbs. at £2 4s. 4d. a cwt.

33. Reduce to simple fractions:

$$2\tfrac{1}{2} + \frac{3\frac{1}{4}}{4} - 2\tfrac{1}{2} \text{ of } \tfrac{4}{5} + \frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{2} + \frac{1}{3}} \text{ of } \tfrac{1}{2}.$$

$$2\tfrac{1}{2} + \left(\frac{3\frac{1}{4}}{4} - 2\tfrac{1}{2}\right) \text{ of } \left(\tfrac{4}{5} + \frac{\frac{1}{2} - \frac{1}{3}}{\frac{1}{2} + \frac{1}{3}}\right) \text{ of } \tfrac{1}{2}.$$

34. Multiply 322·5 by ·0101 and divide the product by ·00000215.

35. A person is able to perform a journey of 142·2 miles in 4½ days, when they are 10·164 hours long; how many days will he be in travelling 505·6 miles when the days are 8·4 hours long?

36. Prove that any number, having 2, 1, and 6 for the three last figures, is divisible by 72, provided the sum of the remaining digits is divisible by 9.

37. Multiply £62 12s. 6½d. by 76; and find the price of a barrel of wheat, if 31 barrels cost £38 17s. 7d.

38. Reduce 44859 farthings to pounds, shillings, and pence; and 360,000 lbs. to tons, cwts. &c.

39. Simplify

$$3\tfrac{1}{2} + 2\tfrac{1}{3} + 7\tfrac{1}{4} - \tfrac{5}{6}.$$

$$\tfrac{5}{6} \times 3\tfrac{2}{11} \times 19\tfrac{1}{5} \div 5\tfrac{1}{11}.$$

$$\frac{\tfrac{81}{49} - \tfrac{5}{12} \times 1\tfrac{2}{3}}{1\tfrac{2}{7} + \dfrac{1}{1\tfrac{1}{5}}} \times 2\tfrac{1}{19}.$$

40. Find the value of $\dfrac{1}{2 + \dfrac{1}{3 + \frac{1}{4}}}$ of $\tfrac{3}{13}$.

41. Express £3 13s. 7½d. as the decimal of £5. and find the value of $\cdot 341\dot{6}$ of £1.

42. Find the Greatest Common Measure of 18315 and 36135; and the Least Common Multiple of 365, 407, 18315, 24309, and 36135.

43. A merchant bought 45 gallons of French brandy at 3s. 2¼d. per pint, 12 gallons of British for £15, and then mixing the whole with 22 quarts of water sold it at the rate of 3s. 3d. per quart. How much did he gain or lose by the transaction?

44. Simplify

$$\left\{2\tfrac{3}{7} - \tfrac{3}{7} \times \frac{4\tfrac{3}{4} \times 3\tfrac{1}{2} + 3\tfrac{1}{2} \times 6\tfrac{1}{9}}{4\tfrac{3}{4} \times 1\tfrac{3}{4} - 6\tfrac{1}{9} \times 1\tfrac{3}{4}}\right\} \div$$

$$\left\{3\tfrac{2}{5} \div \frac{2}{5}\,\frac{\dfrac{1}{5 + \dfrac{1\frac{3}{5}}{3\frac{2}{5}}} + 3\tfrac{2}{5}}{\dfrac{1}{5 + \dfrac{1\frac{3}{5}}{3\frac{2}{5}}} \times 3\tfrac{2}{5}}\right\} \times \left\{\frac{\dfrac{6\frac{3}{8}}{11} + \dfrac{\frac{1}{11}}{1 + \frac{3}{5}}}{4 + \dfrac{1}{\frac{3}{2} + \frac{1}{8}}}\right\}.$$

45. Find by practice the value of 1680 articles at 2s. 7½d. each, of 1861 at £1 2s. 8d. each, of 1862 at £11 2s. 9d. each.; also of 5 cwt. 2 qrs. 7 lbs. of sugar at £21 5s. per ton.

46. Divide ·000045 by 250, ·0045 by 2·25, 4·5 by ·0000135. Find the sum of $\cdot\dot{0}34\dot{5}$, $\cdot 0\dot{3}4\dot{5}$, $\cdot 0\dot{3}\dot{4}5$, $\cdot 034\dot{5}$, ·0345.
47. If the wages of 11 men for 7 weeks amount to £36 9s. 4d., for what time will 7 men work for the same money?
48. Express in words the number which multiplied by 479 will give 4794790048379 for product.
49. Reduce $\frac{4216}{53652}$ to its lowest terms.
Find the Least Common Multiple of 11, 21, 24, 27, 28.
50. A certain number of regiments are formed into 3 brigades, so that there may be the same number of regiments in each, the regiments in any one brigade being of the same strength. Find the number of regiments and strength of each; the brigades containing 5622, 6450, and 6858 men respectively.
51. Reduce 2222222 drs. to tons &c.
52. What is the value of 8 lbs. 1 oz. 10 dwt. of gold, at £3 17s. 10½d. per oz.?
53. Find the value of

$$\tfrac{6}{5} \text{ of } \frac{11\frac{1}{9} - 6\frac{1}{4}}{3\frac{1}{8} + 2\frac{1}{2}} \times \frac{\dfrac{7}{2 + \dfrac{1}{3 + \frac{1}{4}}}}{\dfrac{13}{4 + \dfrac{1}{3 + \frac{1}{2}}}}.$$

54. Reduce 5s. 7¾d. to a fraction of £13 11s. 0d.
55. Find the value of $\frac{1}{7}$ of £2 3s. 9d. + $\frac{8}{17}$ of £3 2s. 11d. — $2\frac{3}{17}$ of a farthing.
56. An express train runs 48 miles in 72 minutes. How far will it run in 3 hours 3 minutes?
57. Find the Greatest Common Measure of 1,141,758 and 19,823,626; and the Least Common Multiple of 19, 39, 42, 61, 78, 84.

58. Find the least number which, separately divided by the numbers 3, 5, 7, 9, 12, 14, leaves the same remainder — 2; also the least number leaving the remainders 2, 4, 6, 8, 11, 13, respectively.

59. Find the greatest number that will divide 638443 and 34093, leaving remainders 11 and 13.

60. Reduce to decimals $12\frac{31}{32}$, $\frac{22}{35}$.
Simplify ·01001 + 5·27 × ·000483 ÷ ·030.

61. Reduce 12·15625 — 10·3125 to fractions, and simplify the result.

62. Simplify

$$\frac{7569{\cdot}8 \div 695{\cdot}8809.}{{\cdot}9\dot{2}8571\dot{4} \times \dot{3}0769\dot{2}.}$$

63. Reduce £128 9s. $10\frac{1}{2}$d. to the fraction of £510 1s. $7\frac{1}{2}$d., also to the decimal of £150, and find the values of $\frac{5}{3} \times \left\{\frac{3}{20}\right.$ of an acre $+ \frac{5}{32}$ of a rood $- \frac{1}{11}$ of a perch $- \frac{5}{16}$ of a yard.$\left.\right\}$

$$\frac{2{\cdot}3475 \text{ of } 1 \text{ ton} + 4{\cdot}6875 \text{ of } 1 \text{ cwt.} + {\cdot}5 \text{ of } 3 \text{ qrs.} - 1{\cdot}4 \text{ lbs.}}{1{\cdot}05 \text{ of } 1 \text{ ton.}}$$

64. A person has an income of £200 a year, and pays income-tax at 7d. in the £.; when $2\frac{1}{2}$d. in the lb. is taken off sugar, what must be his yearly consumption, that he may just save his income-tax?

65. A leaky cistern is filled in 5 hours with 30 pails of 3 gallons each, but in 3 hours with 20 pails of 4 gallons each. Find how many gallons the cistern holds, and in what time the water would waste away.

66. An ignorant fellow said that he should spend half his income, save a third, and devote a fourth to his business. His income was £780 a year. Point out his blunder, and divide his income rightly in the same proportions.

67. If 2 cwt. 3 qrs. 12 lbs. cost £3 15s., what will be the cost of 1 ton 5 cwt. at the same rate?

68. Reduce $\frac{3}{4}$ of $\frac{7}{8} \div \frac{5}{9}$ of $6\frac{1}{4}$ and $\frac{2{\cdot}3}{1{\cdot}\dot{7}} \times \frac{13{\cdot}\dot{8}\dot{5}}{1{\cdot}0\dot{2}} \div \frac{4{\cdot}9}{1{\cdot}21}$ to simple decimals.

69. Find the value of $\cdot1769\dot{1}7989\dot{4}$ of 9 guineas, and of $\cdot4981\dot{0}\dot{6}$ of 2 leagues, and reduce 1 qr. 13 lbs. 6 oz. 6 dr. to the decimal of a ton.

70. If the sixpenny loaf weighs 4·35 lbs. when wheat is at 5·75 shillings a bushel, what does it weigh when wheat is at 18·4 shillings a bushel?

71. Find the price of 7241 articles at 15s. $4\frac{1}{4}$d. each, and the cost of carrying them 26 m. 6 fur. 32 poles at 13s. 4d. a mile.

72. If £240 be paid for bread sufficient to support 49 persons for 18 months, when wheat is 48 shillings a quarter; how long will £235 find bread for 94 persons, when wheat is at £2 16s. a quarter?

73. Find the Greatest Common Measure of 7455 and 47223, also of 4446, 4712, and 5301, and the Least Common Multiple of 37, 49, 86, 98, 148.

74. Simplify $\frac{5}{8}$ of $6\frac{3}{19} \times 2\frac{2}{3} \div 4\frac{1}{3}$
$7 + \frac{5}{6} + \frac{11}{12} + 7\frac{3}{4} - 12\frac{19}{34}$
$8\frac{1}{2} - \frac{1}{4}$ of $6 - 3\frac{1}{7}$ of $5 + 29$.

75. Find the value of $\frac{9}{14}$ of $\frac{1}{6}$ of 3 qrs. 4 bushels, and reduce $3\frac{1}{2}$ of £1 5s. 6d. to the fraction of 3 guineas.

76. Find the values of 1·0625 of £3 14s. 6d. and of ·635 of a mile + $\cdot10\dot{4}\dot{5}$ of a furlong — 1·75 of 3 yds. + $\cdot\dot{1}4285\dot{7}$ of 1·4 feet, and reduce 14 cwt. 2 qrs. 23 lbs. 4 oz. to the decimal of 5 tons.

77. A contractor engaged to finish 6 miles of railway in 170 days, but after employing 80 men for 90 days, he found that a distance of only 3600 yards was

completed; how many additional men must he employ, in order that the work may be finished within the given time?

78. If the digits of the numbers in the eight line of the Multiplication Table are successively added together, the resulting series will be 8, 7, 6, 5, 3, 2, 1, 9, &c. Explain why this is.

79. Express $\frac{1}{7}$ as a fraction whose denominator contains no digit other than 9. Also express $\frac{1}{9}$ as a fraction whose denominator contains no digit other than 4.

80. The Least Common Multiple of two numbers is 3060288 and their Greatest Common Measure is 168. If one number is 12096, find the other.

81. Find the Greatest Common Measure of 8519361 and 8502341 without dividing.

82. Shew from first principles that 4 times 3 = 3 times 4. Multiply 8957 by 234, multiplying first by the 3, then by the 2, and last by the 4.

83. In every division the dividend is greater than twice the remainder.

84. A fine of £3 had to be raised among a number of boys: one-third paid 9d. each, as many more 1s. 3d., and the remainder 1s. 9d. each. How many boys were there?

85. Find the Greatest Common Measure of 37499 and 236511, and the Least Common Multiple of 40, 77, 88, 50, 108.

86. A loaded truck weighs 4 tons 3 qrs. 1 lb., the truck itself weighs a ton and a half, and it contains 758 equal parcels; find the weight of each.

87. Simplify $\dfrac{\frac{5}{7} \text{ of } \frac{2}{9} \times 13\frac{1}{2}}{\frac{1}{9} \text{ of } \frac{3}{7} + 40}$, and find the sum of

$$134{\cdot}\dot{0}\dot{9} + 97{\cdot}\dot{2}6 + 9{\cdot}08\dot{3} + 1{\cdot}5 + {\cdot}\dot{8}1\dot{4}$$

both by fractions and decimals.

88. Find the value of 7817 articles at 15s. $6\frac{3}{4}$d., and of 8 oz. 13 dwt. 16 gr., at £1 10s. $9\frac{1}{2}$d. an ounce.

89. Find the value of $\frac{5}{32}$ of $5\frac{1}{3}$ of £273 2s. 6d., and reduce $\dfrac{3\frac{1}{9}}{1\frac{1}{13}}\left\{\frac{19}{120}\text{ of £1} - \frac{7}{48}\text{ of 1s.}\right\}$ to the fraction of 27 shillings.

90. Find the value of $2{\cdot}86805$ of 3s. + $\cdot 8\dot{3}$ of 4s. — $\cdot 07$ of £2 10s., and reduce the result to the decimal of £5.

91. If 6 men earn £14 12s. 6d. in 15 days, how much will 20 men earn in $23\frac{1}{2}$ days?

92. Find the Greatest Common Measure of 47154 and 172347.

93. Find the Least Common Multiple of 28, 136, 357, 595, 4760.

94. Find the value of $2\frac{3}{7}$ of £16 11s. $7\frac{1}{2}$d., and express $5\frac{1}{4}$ of $6\frac{2}{7}$ of $\dfrac{8\frac{1}{3}}{4\frac{1}{2}} \div 4\frac{2}{5}$ as a simple fraction.

95. Reduce the sum of $\dfrac{2\frac{1}{3}}{9\frac{1}{10}}$ of £1 12s. $2\frac{3}{4}$d., and $\frac{5}{11}$ of £5 17s. 4d. to the fraction of £1.

96. Reduce $\dfrac{12\frac{3}{4}}{10\frac{1}{5}}$ and $1\frac{5}{41}$ to decimals, and $2{\cdot}41\dot{6}$ to a vulgar fraction.

97. Simplify $2\frac{9}{28} + \dfrac{1{\cdot}2 \text{ of } 7{\cdot}5}{\frac{3}{4} + 4{\cdot}5} - \dfrac{\cdot 9375 \text{ of } 3{\cdot}\dot{6}}{\cdot 91\dot{6}} + 11{\cdot}\dot{5}7142\dot{8}$.

98. Find the value of $\cdot 203125$ quarters of wheat, and of $46{\cdot}\dot{9}\dot{0}$ of 1 mile 6 fur. 20 poles.

99. Reduce £2 19s. $5\frac{1}{2}$d. to the decimal of £1.

100. Find the price of 672 tons of goods at £5 14s. $6\frac{3}{4}$d. a ton each, and the rent of 6 poles 4 yards 2 feet 36 inches at 6s. 3d. a square yard.

101. If 6 cwt. 2 qrs. 7 lbs. of sugar cost £21 8s. 9d., what

will be the cost of 1 qr. 13 lbs. 8 oz. and what is the price per pound?

102. If in practising, 7 riflemen shoot 26 rounds in 1 hour 31 minutes, how many rounds will 35 riflemen shoot in $5\frac{1}{4}$ hours at the same rate?

103. How much paper $1\frac{1}{2}$ yards wide will be required to paper a room 18 ft. 6 in. long, 12 ft. 6 in. wide, and 11 ft. 9 in. high, and what will be the cost of it at 1s. 9d. a square yard?

104. Find the Greatest Common Measure of 48276 and 1058265, and the Least Common Multiple of 45, 99, 126, 132, 275.

105. How many hogsheads of sugar, each containing 2 cwt. 1 qr. may be bought for £1767 3s. if 1 cwt. 0 qr. 14 lbs. cost £2 7s. 3d.?

106. Simplify $\frac{7}{11}$ of $3\frac{2}{7}$ of $4\frac{1}{2} + 1\frac{1}{11}$, and

$$\frac{\frac{2}{5}\text{ of }3\frac{1}{2} + \frac{1}{4}\text{ of }7\frac{2}{3}}{\frac{6}{11}\text{ of }\frac{3}{5}\text{ of }2\frac{3}{4} - \frac{4}{5}}.$$

107. Find the value of $4\frac{3}{8}$ of $3\frac{1}{5}$ of 3 poles 2 yds. 1 ft. 9 in. and reduce $\frac{11}{7}$ of 3 roods 27 poles 14 yds. to the fraction of 15 acres.

108. Find the price of 5431 articles at £4 18s. $7\frac{1}{2}$d. each, and of 5 cwt. 3 qrs. 17 lbs. 8 oz. at £1 13s. $9\frac{1}{2}$d. per cwt.

109. Simplify $3{\cdot}0\dot{4} + 13{\cdot}1\dot{4}\dot{5} + 163{\cdot}20\dot{8}1\dot{4} - 47{\cdot}\dot{1}4285\dot{7} - 24{\cdot}875$, and find the product of

$$\frac{1\frac{1}{2}\text{ of }19\text{ of }{\cdot}0342 \times 1{\cdot}4\dot{4}\dot{2}}{{\cdot}75\text{ of }57{\cdot}76}\text{, and }\frac{\frac{1}{5}\text{ of }8{\cdot}5}{{\cdot}0045\text{ of }{\cdot}3\dot{0}\dot{9}}.$$

110. Subtract $\dfrac{2\frac{4}{7}\text{ of }3\frac{2}{3}\text{ of }9\frac{4}{5}}{1\frac{10}{11}\text{ of }6\frac{7}{8}\text{ of }7\frac{1}{3}}$ from the sum of $9\frac{15}{16}$, $10\frac{7}{8}$, $17\frac{24}{25}$, and $1\frac{3}{4}$.

111. Find the difference between

$$\frac{\frac{1}{4} - \frac{1}{5}}{\frac{1}{4} + \frac{1}{5}} + \frac{\frac{1}{5} - \frac{1}{6}}{\frac{1}{5} + \frac{1}{6}}\text{ and }\frac{\frac{1}{8} - \frac{1}{10}}{\frac{1}{8} + \frac{1}{10}} - \frac{\frac{1}{10} - \frac{1}{12}}{\frac{1}{10} + \frac{1}{12}}.$$

112. Simplify $\dfrac{1-\frac{1}{2}\times 3\frac{1}{3}+1\frac{2}{3}\times\frac{4}{5}}{1+\frac{1}{2}\times 3\frac{1}{3}-1\frac{2}{3}\times\frac{4}{5}}$, and

$$\cfrac{1}{2-\cfrac{1}{3+\cfrac{1}{4-\cfrac{1}{5}}}}-\frac{4}{21}.$$

113. What is the least factor which will make the product of the first 10 natural numbers a perfect square?

114. Find the Greatest Common Measure of 154275, 4937625, and 647955; all the Common Measures of 1554 and 3066; and the Least Common Multiple of 12, 100, 48, 180, 294, 847, 143, 55, 56.

115. The remainder of a division is 97, the quotient 665, and the divisor 91 more than the sum of both; what is the dividend?

116. A labourer's wages amount to 18 shillings per week; how much per year have his family to live upon if he lays by £11. per year for house rent and clothes?

117. If I buy 60 yards of cloth at 5 yards for a guinea, and 70 yards at 7 yards for a guinea, and sell the whole at 12 yards for 2 guineas, what do I gain or lose?

118. If a spinning mule of 360 spindles turn off 5 hanks of yarn of 840 yards each, in 8 stretches, what will be the length of each stretch?

119. If I buy a hogshead of sugar, weighing 14 cwt. 1 qr. 24 lbs., tare 1 cwt. 0 qr. 10 lbs., at 6¼d. per lb.; and another weighing 13 cwt. 2 qrs. 26 lbs., tare 1 cwt. 2 qrs. 6 lbs., at £2. 16s. per cwt.; what will the whole amount to?

120. If £100. will pay the expenses of 5 persons for 22 weeks 6 days, how long would 12 persons be supported by £150.?

121. What number added to $\frac{3}{4}$ of $(\frac{4}{15} + \frac{1}{9})$ makes $3\frac{1}{4}$; and what number divided by $\frac{1}{4}$ of $\frac{1}{48}$ will give $\frac{64}{315}$?

122. A cistern is fed by a spout which can fill it in 2 hours; how long would it take to fill it if the cistern has a leak which would empty it in 10 hours?

123. How many shillings, crowns, and pounds are there in 60 guineas?

124. From 117 tons 12 cwt. 1 qr. 17 lbs. subtract 93 tons 17 cwt. 1 qr. 19 lbs. 12 oz.

125. Multiply £19 17s. $2\frac{3}{4}$d. by 989.

126. Find the value of
$\frac{2}{10} + \frac{3}{100} + \frac{7}{1000} + \frac{5}{10000}$ and reduce it to a decimal. ·1 × ·1 × ·1 × ·1 × ·1 × ·1 ÷ ·00125.
(·00607 + ·08793 − ·0095) × ·0504 ÷ 3·8025.

127. $1{\cdot}\dot{1}4285\dot{7} + 4{\cdot}\dot{1}3\dot{6} + {\cdot}85\dot{7}1428\dot{5} + 12{\cdot}\dot{8}6\dot{3}$.
${\cdot}\dot{0}20\dot{2} \div {\cdot}\dot{2}0\dot{2}$, $1{\cdot}\dot{0}3\dot{7} \times 1{\cdot}\dot{6} \div {\cdot}0\dot{2}\dot{8}$.

128. Reduce

$$\frac{\frac{3}{16}\text{ of a guinea} - \frac{2}{15}\text{ of a sovereign}}{9\text{ shillings} - 7\frac{1}{2}\text{ of }\frac{2}{3}\text{ of a farthing}}\text{ to a decimal.}$$

129. *A* and *B* have together £310, *B* and *C* £405, *A* and *C* £550; find what *A*, *B*, and *C* have respectively.

130. Find the value of

$$\frac{1}{3\frac{1}{3} + \frac{1}{4\frac{1}{4}}}\text{ of }3\,\frac{9\frac{2}{3}}{17}\ \ldots\ldots\ (1),$$

131. $\dot{6}$ shillings $+ \left\{{\cdot}25 + \frac{9{\cdot}5 + 1\frac{5}{6}}{8}\right\}$ £....... (2).

132. Divide ·072108 by 4·006.

133. Express as decimals $7\frac{3}{32}$, $\frac{3}{1100}$; and as vulgar fractions ${\cdot}008\dot{2}\dot{5}$ and ·203.

134. The bottom of a rectangular tank is 22 ft. 4 in. by 16 ft. 6 in.: find its area in square feet. How many

cubic feet of water will the tank contain, when there are 6 feet of water in it?

135. A man takes 55 minutes to walk to Cherryhinton by the road, and 58 min. 40 sec. to return by the fields, walking at the same pace. The distance by the road is 3¾ miles; what is it by the fields?

136. If 225 cartridges are supplied to a squad of 15 men for 3 days' practice, how many must be supplied to a squad of 13 men for 5 days?

137. Find the value of

8765 articles, at 14½d.

3 gal. 2 qts. 1 pt., at 18s. 6d. per gallon.

138. The length of a decimetre is 3·937 inches, find the number of solid inches in a cube the length of whose side is a decimetre.

139. Find the contents of a room 29 ft. 6 in. long, 11 ft. 3 in. broad, and 10 ft. 8 in. high.

140. Reduce 3¾d. to the decimal of 10/ and divide the result by 12·5.

141. If 3·75 yds. of cloth cost £3·625, what will 38 yds. 2 qrs. 3 nails cost?

142. A Company of Militia, consisting of 72 men, is to be raised from three towns which contain respectively 1500, 7000, and 9500 men; how many must each town provide?

143. Divide 28 tons 4 cwt. 3 qrs. into 36 equal portions, and find the value of one of them at £7. 10s. 8d. per cwt.

144. Find the value of:

$$9\tfrac{5}{12} - \frac{1}{4\frac{4}{9}} + 12\tfrac{14}{15} - 7\tfrac{5}{8} - 4\tfrac{7}{10}.$$

$$\cdot 0018 \div 270,\ 270 \div \cdot 0018.$$

$$\cdot\dot{7}2390\dot{5} \div 2\dot{1}\cdot\dot{7}.$$

145. Simplify $2\frac{2}{3} - \frac{1}{3} \times 5\frac{4}{7} + \frac{6}{7}$.

$$\frac{3\frac{1}{5} - \cfrac{1}{1 - \cfrac{1}{1 + \frac{5}{9}}}}{3\frac{1}{5} \times 2\frac{1}{4}} + \frac{5}{7} \times \frac{1\frac{5}{11}}{13 + \frac{3}{4}} \times \frac{(1 - \frac{1}{4}) \text{ of } \frac{1}{3} + \frac{2}{3}}{4\left(1 + \frac{1}{11}\right) + 3\left(2 - 1 \div \frac{1}{2}\right)}.$$

$\cdot 34\dot{1}\dot{6} + \cdot 0\dot{3} + 2\cdot 55611 + \cdot 00000\dot{1} + \cdot 13\dot{9}4\dot{5} + \cdot\dot{6}4839\dot{0}$.

$34\cdot 659 + \cdot 0007 + \cdot 41 + 171\cdot 3$.

$\cdot 005 \times \cdot 24 \times 9\cdot 1 \times 50$.

146. Reduce £85 15s. 7¾d. to the decimal of £100.

147. £100 was divided amongst a number of men and boys, so that the boys received 5s. 7d., the men £1 each. Find the number of men and boys.

148. What is the lowest number, containing no digit but 5 and 7, and of them an equal number, which is exactly divisible by 9?

149. Find the sum of all multiples of 66 that can be obtained by arranging the digits 1, 2, 3, 9, 9.

150. Find the Greatest Common Measure of 226512 and 2909907, and the Least Common Multiple of 1176, 67914 and 3267.

151. Find by addition the Greatest Common Measure of 6230485 and 3769515.

152. The Greatest Common Measure of two numbers is 37, and their Least Common Multiple 8412690. Find the product of the numbers.

153. Write down, without multiplying out, the Greatest Common Measure and Least Common Multiple of $2^5 \times 3^4 \times 7^2 \times 11^6$; $3^4 \times 5^7 \times 11^3 \times 7^5$; $2 \times 3^9 \times 11^8 \times 13^3 \times 7^7$; $2^7 \times 5^{10} \times 7^9 \times 11$.

154. Multiply £117 14s. 3¼d. and 1171094 by ·125.

155. Divide £896134 15s. $6\frac{1}{4}$d. by 47 and by 9.

156. Divide $\frac{5}{42}$ of a yard into twelve equal parts, and find the length of seven of them.

157. Write down in words: 20020020; 110173521; and express in figures five hundred thousand and fifty; five million and five hundred; and add together these four numbers.

158. Subtract 1001001 from two millions.
Multiply 3091 by 2070.

159. Divide 329573 by 72, both by factors and long division; and show that the remainder is the same.

160. Reduce 237023 oz. to tons, and find how many three-halfpenny pieces there would be in £100 12s. $7\frac{1}{2}$d.

161. Multiply £457 1s. $6\frac{3}{4}$d. by $63\frac{4}{7}$; and divide £3715 18s. 9d. by 470.

162. Divide 3587 yds. 9 in. into 27 equal distances.

163. How many ducats, each worth 4s. 9d., are contained in £231 16s.

164. If 26 pieces of cloth cost £30, what will 91 such pieces cost?

165. If a person save 7s. 6d. a week, how much will he save in 392 days?

166. Find the Greatest Common Measure of 88 and 72, of 459 and 72351; and the Least Common Multiple of 2, 7, 13, 21, 39, 144, 91, and of 111 and 185.

167. Reduce $\frac{473}{210}$ to a mixed number; $22\frac{5}{11}$ to an improper fraction; and $\frac{246}{342}$ and $\frac{235}{611}$ to their lowest terms.

168. Find the values of the following:

$7\frac{1}{3} \times \frac{9}{11} \times 17 \times \frac{1}{2} \times 8\frac{4}{9} \times \frac{1}{8}$; $100\frac{5}{6} + 1\frac{3}{4} + \frac{1}{3} + 7\frac{2}{5}$;

$1\frac{1}{3} + \frac{8}{3}$ of $\frac{41}{34} + \frac{4}{5\frac{1}{10}}$; $\frac{5}{7} \times \frac{2}{9} \times 13\frac{1}{2} \div (\frac{1}{9} \times \frac{3}{7} + 54)$;

$7\frac{4}{5} - 7 \times \frac{4}{5}$; $(\frac{2}{19} + \frac{1}{3}) \div (3 - \frac{1}{3}) \times (\frac{1}{3} + \frac{1}{5})$.

$$2\frac{1}{2} + \cfrac{1}{3\frac{1}{3} + \cfrac{1}{4\frac{1}{4}}}.$$

169. Find the values of the following:
42·257 + ·2108 + 2·47 + ·0002 + 5·062; ·003 × ·27 + 90; ·27 ÷ ·003; ·006 ÷ 600; 600 ÷ ·006.

170. Reduce $\frac{3}{8}$, $\frac{13}{16}$ to decimals, and 4·075, ·0064 to fractions.

171. Find the value of the following series, correct to 5 places of decimals:

$$16\left\{\frac{1}{5} - \frac{1}{3\times 5^3} + \frac{1}{5\times 5^5} - \frac{1}{7\times 5^7} + \dots\right\} - \frac{4}{239}.$$

$$2 + \frac{1}{1\times 2} + \frac{1}{1\times 2\times 3} + \frac{1}{1\times 2\times 3\times 4} +$$

$$2\left\{\frac{1}{7} + \frac{1}{3\times 7^3} + \frac{1}{5\times 7^5} + + \dots\right\}.$$

172. Convert into vulgar fractions in their lowest terms: $\cdot 01\dot{7}$; $2\cdot 3\dot{4}\dot{8}$; $\cdot 7\dot{2}7\dot{2}$.

173. Reduce $2\frac{5}{7}$ of 14 lbs. to the fraction of 3 qrs. 11 lbs.; $\dfrac{3\frac{1}{9}}{1\frac{2}{13}} \times \left\{\left(\frac{19}{120} \text{ of £}1\right) - \left(\frac{7}{48} \text{ of 1s.}\right)\right\}$ to the fraction of 29s.

174. Find the value of 7·125 of $3\frac{1}{2}$ guineas;
$2\cdot 8680\dot{5}$ of 3s. + $8\cdot\dot{3}$ of 4s. — 1·8 of 5s.

175. How many sixteenths of a mile in 3 miles 605 yds.?

176. Half a certain number of persons received £1. 2s. 6d. each, the rest 17/9 each. The whole sum divided was £161. Find the number of persons.

177. Three-sevenths of a number of boys receive 9d. a week each, the rest 1/3; the whole sum divided per month is £522. Find the number of boys.

178. Divide £127. 8s. among 2 men, 3 women and 7 boys, giving the boys each one-third of what a woman received, the men each twice as much as a woman.

179. What will be my net income, if I receive £517 a year, but pay an income tax of $8\frac{1}{4}$d. in the pound?

180. A father gave a purse to each of his children, that of the eldest contained sovereigns, of the second

half-sovereigns, of the third florins, of the fourth shillings and of the youngest sixpences, the same number of coins in each. If the whole value of the present was £6. 14s., what did each receive?

181. Find the number of square feet in a court 15 yds. 2 ft. long by 6 yds. 1 ft. broad.

182. How many sovereigns, half-sovereigns and florins, of each an equal number, are there in £68. 16s.

183. A grocer mixes 77 lbs. of sugar at 10d. a lb. with 125 lbs. at 6d., what will be the price per lb. of the mixture if 12 lbs. are so damaged as to be worthless?

184. In a manufactory employing 300 operatives, some received £1 1s. 6d. a week, ten received 5/6 a day, and others only 2/6 a day; the whole amount paid per week was £288 5s. 6d. Find how many there were of each class?

APPENDIX.

I.

ADDITION.

Add together

1. £93840671. 15s. 3¼d., £10931857. 14s. 6½d, £82876418. 11s. 10d., £34519784. 0s. 11¼, £40918306. 19s. 5¾d., £56034179. 10s. 1½d.
2. £53147863. 17s. 4½d., £19346758. 3s. 8¾d., £41865937. 4s. 7¼d., £9810455. 18s. 5½d., £90081693. 16s. 11¾d., £17323581. 13s. 10¼d.
3. £32475216. 14s. 9¼d., £94375187. 14s. 7½d., £64950427. 15s. 8¾d., £26917345. 16s. 11¼d., £97425063. 1s. 7¼d., £14987184. 5s. 9½d., £87591683. 16s. 4¾d., £12990084. 12s. 3¼d.
4. £35904271. 13s. 7¼d., £32475219. 19s. 8½d., £80465472. 11s. 5½d., £40374220. 17s. 7¾d., £26334033. 7s. 10½d., £81653471. 15s. 2¾d., £87076681. 12s. 3¾d., £31426347. 1s. 9¾d., £17362732. 9s. 1¼d., £84140229. 18s. 7¾d.
5. 1803 lbs. 9 oz. 14 dwt. 13 grs., 743 lbs. 19 dwt. 19 grs., 460 lbs. 11 oz. 19 dwt., 83074 lbs. 8 oz. 23 grs., 19756 lbs. 5 oz. 13 dwt. 19 grs., 17 oz. 15 dwt. 11 grs.

9. 8447 lbs. 11 oz. 9 grs., 93094 lbs. 5 oz. 17 dwt. 16 grs., 67 lbs. 6 oz. 14 dwt. 9 grs., 131 lbs. 7 oz. 16 dwt. 18 grs., 18609 lbs. 11 oz. 4 dwt. 19 grs., 598 lbs. 5 oz. 18 dwt. 8 grs.

10. 18347 lbs. 10 oz. 15 dwt. 3 grs., 21809 lbs. 10 oz. 18 grs., 23095 lbs. 18 dwt. 19 grs., 1345 lbs. 9 dwt. 8 grs., 101 lbs. 11 oz. 3 dwt. 17 grs., 70340 lbs. 11 oz. 15 dwt.

11. 1239 tons 17 cwt. 1 qr. 11 lbs. 8 oz. 10 drs., 18 tons 9 cwt. 3 qrs. 15 drs., 821 tons 3 qrs. 25 lbs. 9 drs., 109 tons 17 cwt. 19 lbs. 14 oz. 4 drs., 3574 cwt. 2 qrs. 17 lbs. 7 oz., 11 cwt. 1 qr. 18 lbs. 13 oz. 12 drs.

12. 24087 tons 11 cwt. 3 qrs. 9 drs., 1896 tons 25 lbs. 9 oz. 7 drs., 8301 tons 7 cwt. 1 qr. 23 lbs. 14 oz. 15 drs., 18967 lbs. 13 oz. 5 drs., 2914 cwt. 2 qrs. 17 lbs. 5 oz. 3 drs., 10 tons 18 cwt. 19 lbs. 14 oz. 8 drs.

13. 215 miles 7 fur. 38 po. 4 yds. 1 ft. 11 in., 917 miles 27 po. 3 yds. 2 ft., 159 miles 197 yds. 2 ft. 8 in., 37 fur. 25 po. 5 yds. 1 ft. 9 in., 1037 miles 1584 yds. 11 in., 9 miles 4 fur. 17 po. 2 yds. 7 in.

14. 1866 miles 3 fur. 29 po. 2 yds. 2 ft. 3 in., 19 fur. 13 po. 1 yd. 27 in., 3075 yds. 2 ft. 9 in., 159 miles 4 fur. 17 po. 5 yds. 4 in., 2309 miles 6 fur. 14 po. 1 yd. 2 ft. 10 in., 187 yds. 1 ft. 11 in.

15. 3467 acres 3 ro. 19 po. 25 yds. 7 ft. 111 in., 119 acres 35 po. 29 yds. 129 in., 124 acres 1 ro. 38 po. 8 ft. 141 in., 371 acres 2 ro. 30 yds. 1 ft. 49 in., 7930 acres 29 po. 7 ft. 89 in., 11 acres 3 ro. 19 yds. 6 ft. 77 in.

16. 13845 acres 1 ro. 26 po. 16 yds. 3 ft. 18 in., 38 acres 25 po. 119 in., 26 acres 2 ro. 24 po. 27 yds., 17 acres 27 po. 19 yds. 8 ft. 138 in., 841 acres 36 po. 28 yds. 4 ft. 28 in., 3 ro. 18 po. 14 yds. 1 ft. 108 in.

II.

MULTIPLICATION AND DIVISION.

Multiply and Divide:

1. £938346578. 17s. 9¼d. by 6,35 and 127.

2. £769970036. 1s. 10¾d. by 4,27 and 233.

3. £137159370. 0s. 1¼d. by 9,55 and 365.

4. £249410673. 14s. 7¾d. by 7,54 and 1865.

5. £240190389. 18s. 11¾d. by 11,63 and 2137.

6. £397063159. 13s. 2¾d. by 12,99 and 3153.

7. £986038970. 10s. 2½d. by 108,1879 and 111¼.

8. £347159061. 16s. 3¼d. by 240,4567 and 227⅓.

9. £1082371549. 15s. 9½d. by 693,2117 and 129⅔.

10. £805419362. 12s. 4¾d. by 792,4231 and 1000¾.

11. 5437 lbs. 9 oz. 15 dwts. 18 grs. by 15,324 and 293.
12. 1250 lbs. 0 oz. 19 dwts. 5 grs. by 40,165 and 167.
13. 9304 lbs. 11 oz. 17 dwts. 23 grs. by 63,840 and 1127.
14. 1347 tons 15 cwt. 2 qrs. 19 lbs. 5 oz. 1 dr. by 36 and 132.
15. 2913 tons 19 cwt. 0 qrs. 25 lbs. 14 oz. 12 drs. by 77 and 97.
16. 8074 tons 3 cwt. 3 qrs. 12 lbs. 9 oz. 15 drs. by 60 and 841.
17. 1401 miles 4 fur. 37 po. 3 yds. 2 ft. 3 in. by 25 and 396.
18. 89015 miles 7 fur. 39 po. 5 yds. 1 ft. 5 in. by 35 and 300.
19. 10847 miles 5 fur. 0 po. 4 yds. 2 ft. 11 in. by 99 and 911.
20. 1345 acres 1 rood 35 po. 25 yds. 8 ft. 109 in. by 48 and 196.
21. 1479 acres 3 roods 29 po. 30 yds. 5 ft. 140 in. by 55 and 528.
22. 8390 acres 0 rood 39 po. 30 yds. 2 ft. 34 in. by 54 and 471.
23. 1574 hhds. 62 gals. 3 qts. 0 pt. 2 gills by 27 and 128.
24. 8930 hhds. 17 gals. 1 qt. 1 pt. 3 gills by 28 and 189.
25. 4789 hhds. 57 gals. 2 qts. 0 pt. 1 gill by 36 and 982.
26. 3106 lasts 7 qrs. 4 bu. 2 pks. 1 gal. by 18 and 132.
27. 1037 lasts 5 qrs. 6 bu. 3 pks. 1 gal. by 32 and 361.
28. 2946 lasts 9 qrs. 3 bu. 1 pk. 1 gal. by 108 and 391.
29. 9641 yrs. 361 days 20 hrs. 47 min. 27 sec. by 56 and 144.
30. 1079 yrs. 194 days 15 hrs. 58 min. 35 sec. by 75 and 156.